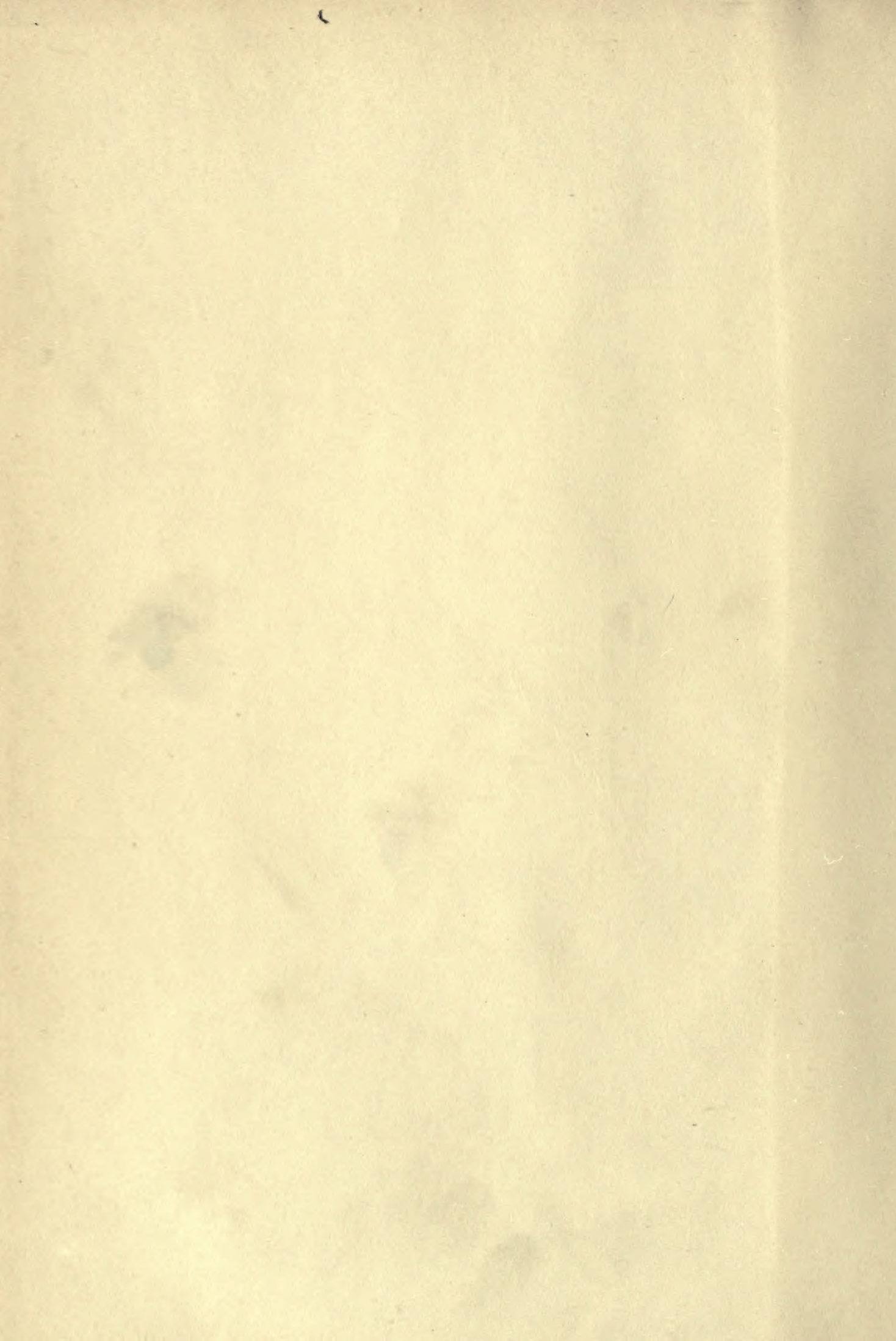



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GARDEN AND FOREST

A JOURNAL OF

HORTICULTURE, LANDSCAPE ART AND FORESTRY

Conducted by

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White's Selborne.

WHAT are known in a general way as Books about Nature have appeared in such abundance during recent years, that one is rather surprised in taking up the announcement of any publisher if he does not find one or two new ones, and, perhaps, a new writer in the list. This may be considered a wholesome tendency in literature, although the man who invades the privacy of nature for the distinct purpose of writing a book will write like a spy or an eavesdropper and try to tell what will please his readers. The man who flees to nature as he plunges into some other form of dissipation simply to escape the weariness of spirit which comes from artificial life, will also certainly fail to find anything in what he sees, and still less in what he feels, that is worthy of description. The man with no faculty for clear-seeing, no imagination, no insight and no sense of humor who writes about nature (and there have been more than one such in our unhappy country) cannot make an entertaining or a useful book, even on such an inspiring theme. From books of this class it is a delight to turn to an inspired book, one which throbs with the pulse of a self-sustaining vitality. *The Natural History of Selborne* was written before the love of Nature had become a fashion, and Gilbert White did not write it as a matter of conscience or of duty. No book was ever more spontaneous, and it is, therefore, one of the few books which the world will not willingly let die. It has delighted clean-minded men and women for more than a hundred years, and the beautiful new edition of it just issued by Messrs. Appleton & Co. of this city is in no way a doubtful venture. Every new generation will find for it a widening circle of readers, and although the scene is laid beneath the soft skies of southern England, it will delight the dweller in the prairie states who has never crossed the sea as thoroughly as it delights one who knows the Hampshire heaths and Sussex downs by heart.

It seems almost as much of an impertinence to attempt any analysis of the charms of this delightful old book as it is to offer explanations for our enjoyment of a woodland walk. Indeed, the sources of our pleasure in the two cases are identical, for in this book, more than in any other of its

class that was ever written, the author entirely forgets himself, and very rarely even records an impression, but simply holds before the reader the exact pictures which present themselves to his eye. We do not mean by this that the *Natural History* gives no idea of the personality of its author. There is the constant evidence of that sympathetic kinship with every living thing which discovers love and order and intelligence everywhere, and there is the faint suggestion of a pleasant humor. But what we really know of the man—his sincerity and kindliness, his broad charity and his reverent love of nature—is found in an atmosphere that hangs over every page rather than in any distinct expression. Thoreau was primarily a poet, and he held that "the poet writes his own biography." To him human life was everything; nature at its best did nothing but reflect the man, and, therefore, this recluse, who seemed to live quite apart from his fellow-men, is now the most distinct figure in American literature. White was not a poet, though he constantly trod on the borderland of poetry. He chronicles phenomena for their own sake, and not at all for their relation to him, and yet we cannot help feeling, by some subtle sympathy, the impressions they left on him, so that the man himself in his essence is set before us in his pages almost as distinctly as if he, too, were consciously writing his biography. Thoreau declared of himself that he was a mystic as well as a natural philosopher, but there was nothing transcendental about Gilbert White. He was no seer of visions and no dreamer of dreams. He simply went about contentedly scrutinizing with the inquisitive eye of a child everything that came within the range of his vision, and he wrote down these impressions which came to him with all the freshness of new discoveries in language as simple and direct as a child's. He did not attempt to lift his subjects into the higher realms of imagination; he never told the world what manner of food they furnished for his spiritual nature. We cannot think of him pronouncing a Fern as Thoreau did, "another sacred scripture helping to redeem life," but he painted the Fern itself so clearly that the reader can apprehend for himself its message of law and love.

This brief contrast between the two men who, standing a century apart, represent, perhaps, what is best in the literature of nature, is made not to set one before the other, but simply to give a hint of the range of their diversity. Our literature would be distinctly poorer if deprived of some of the eagle flights of Thoreau's imagination, and certainly nothing was ever written to fill exactly the place of the *Natural History of Selborne*. No more sane and wholesome book was ever penned. Jefferies was as keen-sighted a naturalist as White, and much more of a poet, but he had none of the serenity of a strong nature, and his work is feverish. He asked the reader into the fields to see him worship nature, and then begged for commiseration because his Deity would not satisfy all the cravings of his morbid desires. White does not say, as Thoreau does, that his profession is to find God in nature, but no one can accompany him in these rambles through Selborne without feeling

That he, and we, and all men move
Under a canopy of love
Broad as the blue sky above.

But it is impossible to say anything new of a book that has delighted the world for so many years. There is no need to speak of the singular clearness and beauty of the style which is the very perfection of descriptive English, nor to repeat that by his acuteness of observation White anticipated one, at least, of the discoveries of Darwin. It may be interesting to Americans, however, to know that he realized that the waste from forest-fires was not so much the wood that was burned as the destruction of future possibilities of the soil, on which point he says:

About March or April such vast heath-fires are here lighted up that they often get to a masterless head and, catching the hedges, have sometimes been communicated to the underwoods, the woods and coppices where great danger has ensued. The plea for these burnings is that when the old coat of heath

is consumed young will sprout up and afford much tender browse for cattle; but where there is large old furze the fires following the roots consume the very ground, so that for hundreds of acres nothing is to be seen but smother and desolation, the whole circuit round looking like the cinders of a volcano, and the soil being quite exhausted, no traces of vegetation are to be found for years.

The American public is to be congratulated on the opportunity to possess an edition of this classic in such a tasteful dress and with many attractive pictures of Selborne as it is, which probably differs less than we might suppose from the Selborne of White's day.

Village Streets and Country Roads.

FOR the enjoyment of prospects on streets, good sidewalks and well-made roadways are necessary. In the business portion of a village there is not much opportunity for growing trees successfully, but many other details go to make a favorable or unfavorable impression on citizens and visitors. Neat arrangements for hitching horses are appreciated by persons who are driving. A good and durable device is in use in the city of Hudson, Lenawee County, in this state. When the main streets were paved the merchants combined and put in three-inch gas pipes of uniform height for posts, with a rail of the same pipe passed horizontally from post to post on which are rings. A really good sign is a rarity in a village, and generally the signs of stores and offices are unattractive or disfiguring. Modern plate-glass windows of generous size help to give a town an enterprising air, as do cleanliness and freedom from all sorts of rubbish. The tasteful arrangement of goods in the stores is no small attraction, but a mixed variety is often allowed to remain in a window for months with little attention from the proprietor.

Any attempt to make country highways attractive is even more rare than an adequate appreciation of beauty in village streets. Some of the roads near which I have lived for the past twenty-five years I have made objects of observation and study. About twenty years ago a double row of American Elms, more than a mile long, was planted along the entire front of the Agricultural College farm. The trees in the street were forty feet apart and ten feet from the fence, alternating with others forty feet apart, four feet inside the fence. In all such designs for planting the idea seems to prevail that long, straight rows of one kind of tree, planted at uniform distance, must in time make a grand display. Such results are, however, rarely realized. In this instance the ground is far from uniform in fertility, and the trees are very uneven in size, some now having a diameter of trunk five times that of others nearly the same age. The shapes of the tops differ a good deal. Some trees are crowded by other trees along the road which have come up of themselves, and by orchard trees in adjacent fields. Occasionally a tree has broken off or been split down. In several instances trees have died, leaving unpleasant breaks in the rows. This season some were much damaged by two or three kinds of insects, while others were less molested. To the west, over a gently rolling surface on the same road, nature and the orderly, old-fashioned pathmaster have been at work. Native trees, shrubs and perennial herbs in great variety have taken possession of the road on either side, and the fences are hidden from sight for much of the distance. Here is a great variety of woody growth and some views such as an artist would select for sketching. I noticed in half a mile five or six kinds of Oaks, three of Poplars, two of Elms, two of Ashes, three sorts of Hickories, eight of Willows, three of Dogwoods, several kinds of Viburnums, one kind of Hazel, a Sumach, three kinds of Maples, a Blue Beech, Ironwood, Basswood, Wild Plum, Wild Crab-apple, Sassafras, Butternut, Black Walnut, Grapevines, Virginia Creeper, Button-bushes, two sorts of Wild Roses, Raspberries, several sorts of Thorns, Asters and Golden-rods in variety. Bunches of second growth or sprouts, where trees or shrubs have been cut down, make pretty clumps, and

groups of Hawthorns are beautiful when in flower, as also in autumn when full of fruit. There are bunches of Willows beyond a bog of Sedges, and over the Willows festoons of Virginia Creeper. On the knolls certain sorts prevail, in the lowlands others are found, while the wet places have still a different combination. The highway is in excellent condition most of the year.

To my way of thinking there is much more to admire along this highway of half a mile, where nature has made her mixed planting, than along the highway where stand the double rows of American Elms. And this illustration has a special application to village planting. I would plant along the village streets, or leave, if already there, some Hawthorns, Dogwoods, Virginia Creepers, Grapevines and a mixed lot of native trees and shrubs. Of course, they should not remain as thick as in the highway referred to, but choice selections could be placed or left in certain suitable spots. To a considerable extent the same general rule applies to the planting of roadsides in the country and to streets in the village, although trees for shade are more essential in the village.

But owners too often do as others have done, cut away all native plants, seed to grass and plant Maples thirty feet apart, exactly one or exactly ten feet from the fence. Along the road already referred to I recently sold an acre to each of two Germans, and made the request, which they seemed to assent to, that I might suggest some of the wild shrubbery that ought to be left. They built houses and began so-called improvements by cutting out all wild shrubs and trees, leaving only a few trees, which they trimmed up from the ground. Still farther west on the road under consideration a pathmaster has several times cut all the young trees and shrubbery, excepting a few nearly in line by the fence. He even cut down some of the largest and finest trees a foot or more in diameter because they were not near enough to the line to suit him.

In planting trees for streets I should first seek some native species, taking care to place each in soil suited for its best development. Once in a while a stubborn planter will persist in a straight row of Sugar Maples, and by so doing the streets become an object-lesson, as they should. It is well enough to plant trees thickly along the street, but the trouble begins when half or two-thirds of them should be removed to give the others room to make fine specimens. Not one man in a thousand has the foresight and the nerve to take out some of the pretty young trees before all become crowded, slim and unsightly. Then it is usually too late, and all are left to struggle with each other.

Agricultural College, Mich.

W. J. Beal.

Opuntia arborescens in the South-west.

THIS large Cactus, the *Tasajo* of the Mexicans, which grows to be a tree on the Tucson plains (see fig. 1, p. 5), was among the first of these plants described from the south-west. It was brought back, with a number of other interesting Cacti, by Dr. A. Wislizenus, from his tour to Mexico in 1846 and 1847. His plants were entrusted to Dr. George Engelmann that he might study and describe the many novelties included in them; and since its discovery it has been cultivated by Cactus-growers, but it is not as popular as many of the smaller and more compact species.

This Cactus has a much more extended range than any other of our cylindrical *Opuntias*. It is found to some extent on the mountains and high plains of western Texas; extends northward into Colorado to the head-waters of the Arkansas and Platte rivers; westward to south central Arizona, and southward far into Mexico.

Although it has frequently been reported from the plains of northern New Mexico and southern Colorado, in this Territory it does not occur north of the great rim which separates the northern plateau from the southern plains. Throughout northern Arizona its place is occupied by the smaller, but closely related, *Opuntia whipplei*, which extends west nearly to California and east into New Mexico.

A plant, much larger than *O. Whipplei*, was found a number of years ago by Dr. Schott south of the Gila River, extending to Tucson. Dr. Engelmann considered this plant a variety of *O. Whipplei* (*O. Whipplei spinosior*). As before stated, *O. Whipplei* has a very limited range, and is confined to the southern portion of the Colorado plateau at elevations of from 5,000 to 7,000 feet. The so-called variety is confined to the low southern plains, growing at elevations of from 1,500 to 3,000 feet above the sea, where it is mingled with *O. arborescens*. After extended field observations, I conclude that *O. Whipplei spinosior* is much more closely related to *O. arborescens* than to the more northern plant, and may more properly be considered a variety of that species.

Opuntia Whipplei is readily distinguished from related species by its usually small size; subprostrate habit of growth; numerous, erect, small, elongated branches, glistening, white, loose spine-sheaths, and small, densely tuberculated, sweetish fruit, which does not turn yellow on ripening, but late in fall withers and dries on the plants. On the other hand, it is almost impossible to separate the southern variety from *O. arborescens*. Both are large, upright, loosely branched plants, with distinct trunks, frequently ten to twelve inches in diameter. The branches are horizontal or pendulous and arranged in whorls. When fully ripened the fruits of both are yellow and well-filled with juice. The seeds are numerous, dark-colored when moist, but becoming white on drying.

The greatest distinction seems to be in the flowers, but here there is so much variation no specific distinction can be drawn. The large magenta-colored flowers of *Opuntia arborescens* usually have numerous broadly obovate petals, while in the other plant the petals are fewer, much narrower and acute at the apex. The flowers of the latter vary in color from greenish yellow, as in *O. Whipplei*, to pink, purple and magenta. It is possible to find plants showing all of these variations only a few rods apart, and even flowers on the same plant show considerable variation.

The flowers of *Opuntia arborescens* appear in this locality during April and May, remain open for two or three days, and are fertilized mostly by bees. These insects, attracted to the flower, enter between the style and stamens, passing down to the base of the style to get the nectar. The numerous sensitive stamens immediately bend forward toward the style, closing over the insect and hiding it from view. It necessitates quite an effort on the part of the insect to escape, but it finally forces its way from beneath the stamens and climbs to the top of the slightly elongated stigma, whence it makes its escape, thoroughly dusted with the pollen from the numerous stamens. In a few minutes the stamens assume their normal condition and the flower is ready for the reception of other insects. I have frequently seen as many as three honeybees enclosed in a single flower.

The twenty to thirty pulvilli on the ovary are at first armed with a number of slender spines which are deciduous in December as the fruit begins to turn yellow. Throughout the summer the tubercles on the ovary are very prominent, but as the fruit ripens it increases considerably in size, becomes much more succulent, and as a result the tubercles are no longer prominent. The fully matured fruit is frequently two inches long and one and a half inches thick. After ripening the fruit remains on the plant through the winter and sometimes through the next summer. The persistency with which the ripened fruit hangs to the plant gives rise to the popular idea that the fruit does not mature until the second year.

Occasionally flowers develop at the pulvilli of a matured fruit, and other fruits are formed on the old one. In such cases the fruit is proliferous, but of two seasons' growth. Most usually the fruit is clustered at the extremity of the branches of the previous year's growth, and during late summer, autumn and winter the verticillate branches are pendulous from its weight.

The spines persist for several years, increasing in num-

ber each year from the upper end of the pulvillus. The trunk and large limbs are destitute of spines, but are covered with a dark brown rough bark in elongated ridges.

The reticulated wood is used to some extent in the manufacture of light furniture, fancy articles, canes, picture-frames, etc. A factory was established in Salt River Valley some three years ago for the purpose of manufacturing articles from this wood.

University of Arizona.

J. W. Toumey.

Foreign Correspondence.

London Letter.

DENDROBIUM CÆLOGYNE.—This is the largest-flowered of the Sarcopodium section of the genus characterized by short, erect pseudo-bulbs, springing at intervals of two inches from a stout creeping rhizome and bearing a pair of leaves, the general appearance suggesting *Bulbophyllum*, or, as in the species under notice, a *Cælogyne*. Sir Trevor Lawrence exhibited a plant of it in flower last Tuesday; otherwise I have never seen it in flower since it bloomed at Kew about seven years ago. I saw a group of healthy, recently imported plants of it in the Clapton nurseries of Messrs. H. Low & Co. a few days ago. The species was described from a plant flowered by the late Mr. John Day in 1871. It has pseudo-bulbs two inches long, elliptic-oblong leathery leaves six inches long and solitary flowers in which the sepals are lanceolate, the base of the two lateral forming a broad chin; the petals are linear and the lip is large, fleshy, scoop-shaped and colored deep purple on the front lobe, pale yellow with purple streaks on the side lobes, the other parts of the flower being dull yellow with reddish lines and blotches. In size the flower is about equal to *C. brunnea*, but fleshier. The species is a native of Moulmien.

DENDROBIUM TREACHERIANUM.—This belongs to the same section as *Dendrobium Cælogyne*, which it resembles in habit, but the pseudo-bulbs are close together, longer and angulate, the leaves shorter, and the scape bears from two to ten flowers, which are two inches long with linear segments, colored pale rose-purple and a rose and dark crimson fleshy lip. It was introduced from Borneo in 1881 by Messrs. Low & Co., but is rare in cultivation, probably owing to the difficulty most cultivators experience in keeping it healthy. Sir Trevor Lawrence is, however, an exception in this respect, for he exhibited a plant this week which bore three spikes, carrying twenty flowers, which was deservedly awarded a first-class certificate and cultural commendation. A figure of this species was published a few years ago in *The Botanical Magazine*, t. 6591, from a plant flowered in a hot moist stove at Kew. It was named by Reichenbach in compliment to Mr. W. H. Treacher, a government official at that time in Labuan.

PHAJUS MISHMIENSIS is a handsome species, of which two examples are now in flower in a warm house at Kew, one of them being the plant described by Mr. Rolfe two years ago as a new species under the name of *Phajus roseus*, and erroneously stated to be from west tropical Africa (*Kew Bulletin*, 1893, p. 6). The other was imported from Calcutta this year as *P. Mishmiensis*, and the two are identical. *P. Mishmiensis* is a native of Assam, Sikkim and lower Burma, and has been known to botanists since Lindley's time, although only lately introduced. I believe Messrs. Low & Co. have some recently imported plants of it. In habit it resembles *P. Wallichii*, but is smaller; the scape is two feet high and bears a dozen flowers, each about one and a half inches across and colored rose-pink when first opened, changing to buff before fading. There are a few whitish spots on the lip and a ridge of white hairs down the centre. It thrives under the same treatment as *P. grandifolius*.

MELASTOMA MALABATHRICUM.—This is an old garden plant of considerable beauty which has fallen into general neglect, except in the Edinburgh Botanic Garden, where this year it formed a pyramid twelve feet high, clothed from top

to bottom with mauve purple flowers two inches across. It is planted out in a bed of light soil in a sunny position in a large stove, and it has grown to its present size from a small plant in about two years. Grown in a pot this plant is scraggy in habit and flowers only indifferently; it is evident, therefore, from the success met with at Edinburgh that liberal treatment gives exceptionally good results. This is equally true of *Pleroma* (*Lasiandra*) *macrantha*, which, for several months, has been a sheet of flowers in a sunny greenhouse at Kew, where it is planted out and trained along wires close to the roof, exactly as if it were a *Glaire de Lyon Rose*. *Melastoma Malabathricum* is a native of India, where, according to Sir Joseph Hooker, it is called by the English "Indian Rhododendron," being common from sea-level up to 6,000 feet. It is a variable plant, as is shown by Mr. Benthham, who included under it no less than twenty-four species of another botanist, Naudin.

RED-BARKED WILLOW.—A beautiful winter effect is obtained at Kew by planting this Willow on the margin of the lake in a conspicuous place, so that the glow of its shining crimson stems gives warmth of color quite equal in effect to that produced by the Siberian Dogwood. This Red Willow is said to be a red form of the common White Willow, *Salix alba*. It forms a handsome bush, but to get the full value of its color in winter it requires to be well pollarded every spring. It is a first-rate garden plant. Here it is called *Sanguinea*.

YELLOW-BARKED WILLOW.—This is another variety of the White Willow, and is known at Kew as *Salix alba vitellina*. It is used in the same manner as the red-barked variety; in fact, the two are planted together, so that the golden yellow wands of the latter heighten the effect of the red shoots of *Sanguinea*.

WHITE-BARKED WILLOW.—This is a variety of *Salix daphnoides* which is grown by Mr. A. Waterer in his Knap Hill nursery as *S. acutifolia*. It is remarkable for the white-flour-like bloom which clothes the stems and makes them look as if it had been whitewashed. These three Willows should be in every garden where shrubs are valued.

RED-STEMMED DOGWOODS.—There are several varieties of *Cornus alba* which are remarkable for the shining red color assumed by the bark of the younger shoots in winter. The best of them is one which at Kew bears the name of *C. alba variegata*, the stems of this being as red as sealing-wax. What is generally grown under the name of *C. sanguinea* (really a variety of *alba*) is a shade or two darker in color, and therefore less effective. It may not be generally known that to obtain a plentiful crop of red-barked shoots on these plants the old stems must be cut out level with the ground every spring; this induces the development of long sucker-stems, and these always assume a rich color in winter. The difference between a specimen thus treated and one left unpruned is so great that they do not appear to be of the same species. At Kew these Dogwoods are planted in large masses in open sites on the lawns, and the color they give all through the winter is most valuable. They are planted in large round beds, and among them are placed spring-flowering bulbs with flowers whose colors harmonize with the red of the Dogwoods. Other red-stemmed Dogwoods grown at Kew are *C. amomum*, a native of North America, which has purplish shoots; *C. stolonifera*, also American, with red-purple shoots, and *C. Baileyi*, a Canadian species, with brownish red bark. This last was figured in *GARDEN AND FOREST*, 1897, page 465.

COMMERCIAL FIBRES.—The importance of fibre-yielding plants is shown by the fact that in 1893 the value of raw fibrous material imported into the United Kingdom alone was £50,000,000, and of the goods manufactured from this material £74,000,000. It is also shown by the correspondence conducted at Kew in relation to fibre-yielding plants, and the information published from thence in the *Kew Bulletin*. The Assistant Director, Dr. D. Morris, C.M.G., whose experience both at Kew and in the colonies constitutes him an authority upon the subject, has told the whole

story of commercial fibres in a series of lectures delivered before the Society of Arts, and since published in an illustrated pamphlet of forty-two pages.* The history and origin of fibre industries, the character and value of the various fibres, the nature and peculiarities of the plants that yield them, with other interesting information, are set forth with that care and thoroughness which characterize all Dr. Morris's work. The pamphlet will, therefore, be the recognized referee upon all fibre questions for some time to come, and, consequently, it will be valued by all who are interested in fibres commercially or botanically. As an instance of what Kew has done and continues to do in fostering plant industries the following is an example: The closing of the ports in Madagascar consequent upon the war with France sent up the price of Raffia bast, hitherto obtained only from that island. Several species of Raffia likely to yield a fibre are known to be abundant on the west coast of Africa. The curators of the botanical stations in our colonies were therefore advised from Kew to look into the matter, and, if possible, collect and send home samples of the fibre from the Palms there. The result has been the important discovery that Raffia as valuable commercially as the best hitherto obtained from Madagascar can be had in any quantity from our possessions in west Africa.

London.

W. Watson.

Plant Notes.

CATTLEYA TRIANE.—This noble and most popular of all Orchids is now in season. Wherever Orchids are grown it will be seen in its full beauty during the Christmas and New Year's season in an infinite number of varieties, from the costly forms with pure white flowers through all the delicate shades of blush and rose and crimson. There is great variety in the coloring of the lip, the throat being generally yellow or orange, while the apex of the lip is more or less intensely colored in purple, bright rose, violet or magenta. This species is becoming more and more popular every year, and as it is inexpensive and easy of culture it will, no doubt, soon be one of the most useful of midwinter flowers. The flowers are lasting and the plant will keep beautiful in a dwelling-house much longer than almost any other flowering plant. Orchids will undoubtedly be useful as house-plants when they become more generally known.

HELLEBORUS NIGER.—The Christmas Rose is the only hardy herbaceous plant flowering in midwinter, and as such deserves to be widely known and cultivated. The buds, as in the case of many other herbaceous plants, are formed during the preceding summer, ready to burst into flower during the earliest warm spell in midwinter. The flowers open more readily during the Christmas season if there has been a severe frost during the preceding months, but even with hardly any frost it is generally possible to have a rich supply of Christmas Roses during the holidays. Any failure in this respect is usually due to a lack of moisture. The freshness and snowy purity of the large-flowered Christmas Rose, *H. niger altifolius*, is unrivaled when forced under glass. Protected against all destructive winds and droughts in December the buds will soon swell and develop if the plants are kept moderately cool and moist and in a sunny position. The foliage and buds must be kept constantly wet, for if the buds are allowed to dry but a little, the beauty of the flowers will be marred. This need of moisture explains why the flowers expand and develop so remarkably well under the snow. When the warm rays of the sun in February melt the snow which snugly covers the leaves and buds, there is a constant moisture which seems to be essential for the preservation of the leaves and for the unchecked growth of the buds. All the varieties of *H. niger* may be forced, either in pots, when large clumps should be lifted

* William Trounce, Gough Square, Fleet Street, E. C. Price, one shilling.

and potted in the fall and stowed away in cool frames, or a frame may be placed over the plants where they grow in the open ground. Where there are only a few plants hand-glasses are useful. Plants will flower earlier when potted, partly because they may be kept more fully under control. A cool and moist place in a Carnation-house is also a very good place for forcing Christmas Roses.

Among the varieties *Helleborus niger angustifolius* is the smallest as well as the earliest. The flowers of this form are slightly greenish during the first days, at least, and gradually assume a reddish tint. This form differs but

Cultural Department.

The Garden in Winter.

DECEMBER is the one month in the year when the garden in this latitude is most nearly at rest. We are apt to think that our plants are perfectly quiet at this season, when frost and snow usually prevail, yet a garden is never at rest if planted with hardy plants and bulbs which flower at different seasons. The summer rest is, perhaps, the only one many of the hardy bulbs know. They start into growth when the cool rains fall in autumn, and it is as natural to many of them to flower in frosty winter or early spring as for others to bloom in



Fig. 1.—*Opuntia arborescens* on the Tucson Desert.—See page 2.

slightly in appearance from the type, but the flowers are smaller. *H. niger maximus*, or *altifolius*, is the largest as well as the purest white of the varieties. It must be remembered when the plants are forced for house decoration that the foliage must be preserved in its full beauty. The leaves in themselves are very handsome deep glossy green and of an elegant habit. They contrast beautifully with the white flowers and form a pleasing background to them. The calyx, which is the showy part of the flower, is persistent; it does not fall, but fades gradually into a reddish gray as the carpels develop.

summer warmth. Such hardy plants—to speak of the common ones—as Primulas, Saxifrages, Aralias, Aubrietias, Spanish Irises, Muscari, Sedums and even Crocuses, show green leaves all winter, and though these are often prostrated by frost, a few hours of sunshine starts them up vigorously. If a bulb is in the habit of flowering at a certain time it may be depended on to start into growth in due season and make constant progress toward maturity under very adverse conditions. The energy expended in growth develops warmth, so that even in a frozen investment there is some progress. It is only solidly frozen earth which will keep many of the Snowdrops under ground after this time of year, and they will always appear after two or three mild days in January. Looking over the

garden at Christmastide I found many of them just peeping up, forced by an unreasonable spell of mild weather. It would be interesting to know by what peculiar arrangement the leaves and axils of these and many other plants are enabled to pass through such trying temperatures without disruption of their axis or permanent injury. Another interesting thing in the garden now is the germination of the various seeds which have fallen or have been sown. Such seeds were germinating the other day, and no doubt I should have found seedlings of Snowdrops had I looked for them, and, perhaps, of other plants which start under slight encouragement of warmth at this season. One of the primary lessons that the experimenter in hardy plants learns is that seeds of many of them have peculiar habits of germination difficult to tabulate. Some seeds, as those of Hollyhocks, will sometimes germinate on the plant in wet weather, and others germinate quickly enough, but a large majority require a certain seasoning and cannot be made to start without it, even though apparently well ripened. This is one of nature's little devices to perpetuate the species by deferring the germination to a fitting season, and we cannot always make haste even when we have fresh seeds at hand. Such seed the plantsman buries in earth or stratifies for such time as may be necessary for its ripening; if, in the mean time, it is frozen up a few times, it receives a quickening. The growing of seedlings is a fascinating pursuit too little appreciated by impatient gardeners.

Wellesley, Mass.

J. N. Gerard.

Plants for Winter-blooming.

EUPHORBIA FULGENS is among the most beautiful of winter-flowering plants, and its long wreaths of brilliant scarlet flowers are effective for conservatory and house decoration. Although considered a difficult plant to establish, we have been fortunate enough to secure the conditions necessary for its successful cultivation. It is a subshrubby perennial which may either be pruned annually and grown on from year to year into large specimens or be grown from cuttings every year. The plan of annually raising new stock is generally the better one, and only where the proper conditions can be provided in partial rest from water during the latter part of the flowering season and during winter should old plants be grown on. These old plants are especially suited for training on pillars, rafters and walls and for conservatory decoration, and used in this way no more effective plants could be chosen.

Soft cuttings are taken with a heel, and placed at once in a propagating-bed with a bottom temperature of sixty-five degrees, Fahrenheit. They will be rooted in about thirty days, and then are potted into thumb-pots in light soil, with some charcoal for drainage. As they are needed they should be shifted, without disturbing the roots, into four, and ultimately into six, inch pots, in which size they bloom. We give them manure-water frequently during the summer. The plants grow luxuriantly, and before the flowering season they are very much pot-bound, a fact to which our success is probably due. A gardener of my acquaintance considers October a critical month in the cultivation of this Euphorbia, as his plants generally fall at this time. Although he is careful, he thinks his loss due to overwatering, perhaps once only at a time when the nights are cool and before fire-heat is in general use. Upon turning out several pots to show the condition of the roots we found all the feeders dead. With regard to fire-heat his experience and mine are the same, but my plants, being pot-bound, were in less danger of injury from overwatering. They are now well rooted through the pots into a gravel-bed, getting about all the moisture they need in this way.

A plant of *Daphne Indica* is enough to fill a large conservatory with its perfume. It is ungainly, not easy to grow, and difficult to propagate from cuttings, which may in a measure account for its comparative rarity. The practice of grafting *D. Indica* and other greenhouse species does not seem to be generally adopted in this country, owing probably to the difficulty of obtaining good hardy stocks. *D. Mezereum*, the principal species used in European countries, is doubtfully hardy here. The usual plan when propagating from cuttings is to take matured side shoots in the autumn and place them in pots in a cool greenhouse to callous over winter. In spring they are started in a gentle heat, and may be expected to root in four to six weeks. I have not, however, succeeded well by this plan, and last spring I tried taking half-matured shoots with a heel, and placing them in an ordinary propagating bed, without bottom-heat. They all calloused and some were rooted in two months; all were then potted into three-inch pots in a mixture of loam and peat and a little sand, with some charcoal for drainage, and they are now bushy little plants

about eight inches tall, and most of them have matured a small umbel of bloom.

Libonia Penrhosiensis is a handsome evergreen winter-blooming subshrub, a hybrid between the well-known *L. floribunda* and *Jacobinia* (*Senecographis*) *Gheisbreghtiana*. Grown every year from cuttings taken early in spring and planted outdoors for the summer, the plants make neat little bushes about a foot in diameter and a foot high, which can easily be lifted and potted into six-inch pots. The flowers are tubular, orange red, about an inch long, slightly labiate, and horizontally exerted in small panicles from the axils of opposite leaves. They are produced successively, and in sufficient numbers to make the plants effective and at the same time never untidy for a month or more; and when out of bloom these handsome little bushes of refreshing green are still serviceable.

Wellesley, Mass.

T. D. Hatfield.

Palm Notes.

Hydiastele Wendlandiana.—This rare and beautiful Palm is rare in this country. It is a tall and slender Australian species, with stems somewhat resembling those of *Seaforthia elegans*, but more slender, with regular ringed nodes. The stem, which under greenhouse cultivation is sometimes seen as high as ten or fifteen feet, carries a leafy crown of long, spreading, pinnate leaflets, with from twenty to thirty pinnæ, sometimes over a foot long, those of the apex confluent at the base and very irregular, with a square-cut ragged and toothed apex and slender petioles, sheathing at the base. This is a moisture-loving tropical Palm of great value for small conservatories, and one of the small Palms that ought to be introduced and grown more commonly. The pots should be comparatively small and well drained, the soil rich and fibrous, and during summer too much water can hardly be given. The species thrives best in a deep shady and warm position. In direct sunlight the leaves always become stunted and disfigured. Seeds are hard to obtain, but germinate readily when fresh.

Astrocaryum argenteum.—This ornamental Palm is a native of the tropical valleys of the United States of Colombia and neighboring countries. It has a distinct and peculiar beauty, with leafy crowns of silvery foliage and numerous black needle-like spines, very long and exceedingly fine and sharp. The leaves are wedge-shaped, pinnate and closely set at the apex of the stem. The lower pinnæ are comparatively narrow and distant, while the upper ones, especially in small specimens, are very broad and confluent, with a torn and toothed apex. While the upper surface is bright green, the lower side is covered with a silvery tomentum which makes the species highly ornamental. Specimens grown in conservatories and greenhouses are generally seen in a stemless condition, with bushy crowns about twice as wide as high, owing to the almost horizontal position of the leaves. Like most silvery plants, these Palms grow in the full glare of the sun, often in apparently dry and barren positions. Under cultivation they will thrive anywhere in a moderate shade or in a quite sunny position. They are of easy culture, doing well under ordinary treatment with moderate heat and moisture.

Triartia Bungeorhii.—Sometimes when growing in moist places Palms assume a peculiar and curious habit. The stem, which from the first grows upward, is very slender, almost thread-like, and consequently unable to support the great weight of the plant in a more mature state, but as the plant increases in size adventitious roots are formed from the stem; like strong and slender buttresses, these support the stem high in the air. As the Palm increases in size stronger roots are thrown out for support. *T. Bungeorhii* is the most beautiful example of this type. It is a rather small Palm with a stem one or two inches in diameter, and, as seen in greenhouses, from four to six feet high, smooth and polished. The leaves are pinnate, with very broad, wedge-shaped pinnæ, irregularly disposed along the slender rachis and obliquely cut and ragged on the edges. The leaves are beautifully green and shining. Lateral roots at first very slender; later on often half an inch in diameter, not unlike the well-known adventitious roots of a Screw Pine. This species will thrive in ordinary rich and fibrous soil in a half-shady position and an average temperature of seventy degrees.

Latania Commersonii.—This species is often grown in conservatories and greenhouses under the name of *Latania rubra*. It is one of the most beautiful and ornamental of all fan-leaved Palms, and a native of Mauritius. The leaves are spreading, eighteen inches to two feet in length, as commonly seen in cultivation, with from fifteen to thirty long and slender wedge-

shaped segments finely toothed at the edge and bordered with a narrow band of a reddish color. The slender petiole is but slightly longer than the blade and of a reddish chocolate hue. *L. Commersonii* is a dwarf species of elegant habit and desirable for all decorative purposes. As a small plant it is more graceful than *Livistona Sinensis*, but of a duller coloring. In conservatories and greenhouses it is thus far very rare, being found only in some of the larger establishments. Rich fibrous loam, with an addition of leaf-mold, well-decayed manure and sand, forms an excellent compost. The drainage must be good, and during summer an abundant watering is necessary, as well as frequent sprayings. Although a tropical Palm, it will do well in any warm greenhouse in a half-shady position.

Chamærops staurocantha.—This picturesque and graceful Palm has large palmate leaves divided into four to eight broad linear segments one foot or more long of a very dark green color. The petioles are very slender, not unlike the petioles of the well-known *Thrinax*, and about twice as long as the blade. The stem is covered with thin fibrous sheaths and protected at the base with enormous-branched spines of a needle-like sharpness. Leaves, in ordinary greenhouse specimens, are from eight to fifteen. This Palm is quite unlike the common types of *Chamærops* in foliage and habit. It is of a striking and unique beauty, and as it requires no special treatment deserves to be more generally grown. As yet it is very rare and expensive. It thrives best in a partial shade, and with ordinary greenhouse treatment in any rich and fibrous soil.

Newark, N. J.

N. J. Rose.

Asparagus Culture for City and Village Lots.

ASPARAGUS, considered as a vegetable, has some peculiarities which distinguish it from other plants of the kitchen garden. The growing plant is very beautiful. Its feathery masses of graceful foliage, its peculiar shade of green in summer, the bright red berries contrasted with the rich yellow of the maturing plant in the autumn, make it well worthy of a place among ornamental plants, particularly in the shrubbery border. In cultivation the plant is injured rather than benefited by frequent stirring of the soil; all it asks is abundant room, not less than five feet square to each plant, and liberal feeding. It takes time to establish itself, but when this is well done a little care and free manuring each year will keep it permanently and enormously productive, a single plant under the Argenteuil system of cultivation having furnished thirty-seven pounds of the choicest asparagus in a season.

The beauty, the ease of culture, the permanency and productiveness of the plants, and the fact that asparagus, even more than most vegetables, should be used when perfectly fresh—should be cut and cooked the same hour—warrant the cultivation of this plant in places where the attempt to grow other vegetables might not be wise. A few plants can be introduced with good effect in highly kept pleasure-grounds. A few can be set in the corner of the fence or beside the shed in places too contracted to warrant the attempt to have a garden of any kind. In fact, there are very few town and village places that could not easily furnish the family with an abundant supply of this vegetable at a trifling expenditure of labor, and without detracting from the beauty or usefulness of the grounds. As a guide to those who may wish to undertake asparagus culture in the way suggested, I give the cultural methods followed in the Argenteuil district of France, which has the reputation of producing the finest asparagus in the world. A considerable proportion of that grown there is the product, not of Asparagus farms, or even of fields and beds, but of single plants or clumps standing by themselves, or in groups of from five to twenty scattered here and there in any open space that may chance to be left in corners or between trees and buildings. Wherever there is an unused bit of ground five feet in diameter, which is not in dense shade or liable to be covered with water, there the Argenteuil gardener sticks in a plant, gives it good care, and is well repaid for his labor.

The method of cultivation is simple. The spot is put in good tilth and made moderately rich; a vigorous plant is carefully set out so that its crown will be about four inches below the surface-level; weeds are kept down by shallow surface cultivation, and in the fall, after the tops are fully matured and dead, the surface for a circle of five feet in diameter is covered with rich and well-rotted manure. As early in the spring as possible this manure is well-forked into the surface, and the starting weeds kept down by shallow hoeing until the plant has made sufficient growth to take care of itself. The third season the treatment is the same as in the second, especial care being taken to take out any seedling Asparagus-plants which may spring up, they being treated as the worst

of weeds. The fourth season the harvest commences, though if the plants have made a good growth a few cuttings are made the third year, but it is considered better practice to wait until the fourth, in order that the plants may become well established. The manure is spaded in as early in the season as possible, and as soon as the first shoots appear at the surface the soil is heaped over the crown of the plant in a mound about a foot high, which serves to blanch the growing shoots. In gathering, the shoots are broken as far as possible below the surface. The covering soil being friable from its abundant manuring enables one to secure much longer shoots than if it were level. Care is taken to remove all the shoots at each picking and not to prolong the season far into the hot weather, so that the plants may have a chance to make a good growth in preparation for the next season's crop. At the close of the season the mound of earth is leveled with the surface, and about two quarts of fresh wood-ashes and a handful of salt are scattered about each plant and hoed into the surface. The treatment given the fourth year is repeated, and the shoots gain in number and size as the plant increases in age.

Detroit, Mich.

Will W. Tracy.

Correspondence.

Class Work in Horticulture at Cornell.

To the Editor of GARDEN AND FOREST:

Sir,—You have said so much in recent numbers on the subject of horticultural education that I make bold to send you a brief account of certain class work as it is now conducted in this university. Course No. 1 in horticulture is a term's work in "The Evolution of Cultivated Plants." Necessarily, much of the discussion turns upon the general theories of evolution and a sweeping conspectus taken of the natural history of the plant-world. The course consists of lectures, but the following account of the incidental work will show something of the scope of instruction. This may be of interest, because we are told that no attempt exactly like it has heretofore been made in this country, and, perhaps, in the world, to apply current philosophical speculations to horticulture.

Aside from the regular class work, the students were called upon during the term for two original essays, one upon the subject, "Expound the Philosophies known as Lamarckism, Darwinism and Neo-Darwinism," and the other, "Why Do Plants Vary?" Each student was also obliged to read and assimilate chapter iii. of Wallace's *Darwinism*; Weismann's original essay on Heredity; a chapter of Cope's *Origin of the Fittest*; two chapters of Herbert Spencer's *Principles of Biology*; chapter xv. of Darwin's *Origin of Species*; Gray's essay on The Flora of Japan. These exercises were selected in order to acquaint the student with some of the leading types of philosophical writing. The final examination comprised the following questions:

(1) What do you understand by the term evolution as technically used at the present time? (2) Name five reasons for the belief in organic evolution. (3) What are the dominant causes of the variation of plants? (4) In what directions does climate modify plants? (5) What is Neo-Darwinism? (6) Explain how bud variation is possible. (7) What, if anything, is the philosophy of pruning? (8) Expound the one chief agency which man can employ in the amelioration of plants. (9) Why does nature cross plants? (10) To what extent has agriculture modified plants?

Cornell University.

Student.

Notes from Southern California.

To the Editor of GARDEN AND FOREST:

Sir,—There are two species of *Bougainvillea* in cultivation here, which are extremely showy. One under the name of *B. glabra*, with very bright bracts, produced in great abundance through the summer and sparingly in winter, so that it is never without flowers. I have a specimen of *B. glabra*, as known in eastern greenhouses, which is not worth growing compared with the other, its bracts being a dingy rose-color and the plant flowering only once in the year. Both have smooth foliage. If the plant I speak of is *B. glabra* I should be pleased to know the correct name of the former. *B. spectabilis*, with bracts of rich crimson magenta, usually flowers from February to April. For some reason it has been in bloom with me during the past three months. This has pubescent leaves and bracts rather larger than the other.

Another climber which has been flowering out of season is *Bignonia venusta*. It bloomed in some gardens during October and November, its usual season being January to March.

We have no more showy winter-flowering vine than this. Last February I saw one vine which covered a large portion of the roof of a carriage-house with a mass of its brilliant orange flowers. During November *Dahlia imperialis* gave us much pleasure. A plant eight feet high, with a panicle of large, drooping white bell-shaped flowers at the top, appears more like a Tree Lily than a Dahlia. It flowers too late for open-air cultivation in the east, but it might be grown in tubs and removed to the greenhouse before frost. It would make a fine companion to *Chrysanthemums* at the fall exhibitions. *Poinsettias* are now in their glory, with dozens of fine heads upon a single plant, producing a blaze of scarlet color. *Lucula gratissima* is just passing out of flower with me. Its large, hydrangea-like trusses of pink flowers, with a rich fragrance somewhat resembling Apple-blossoms, make it a most desirable plant.

Among the wild flowers here there is no absolute pause in the season of bloom. Though there has not been rain enough to permeate the soil since last March and the hills are brown, yet in a walk of half a mile I have just gathered seven species of wild flowers.

A new society has just been organized in Los Angeles, its principal object being the establishment of a botanical garden. It has, therefore, chosen the name of "Botanical Society." The use of several acres of land within the limits of our largest public park has been granted to the society for this purpose. Flower shows will also be held under its auspices.

Los Angeles, Calif.

Edmund D. Sturtevant.

Poisoning Plants.

To the Editor of GARDEN AND FOREST:

Sir,—Plant physiologists tell us that the roots of plants have little or no power of selecting their food and can be poisoned like animals. Lindley further states that substances which are poisonous to animals will prove poisonous to plants. In order to put these questions to a practical test certain experiments have been conducted by Mr. R. A. Emerson, a student in the horticultural department of this university. Solutions were made in ordinary city water with alcohol in the proportions of 1 to 20, 1 to 100, 1 to 1,000, 1 to 10,000; corrosive sublimate, 1 to 100, 1 to 1,000, 1 to 10,000; pure sulphuric acid in the same proportions; aconite, powdered extract of root, 1 to 1,000 and 1 to 10,000; white powdered arsenic, 1 to 1,000 and 1 to 10,000, and strychnine and crystalline sulphate, 1 to 1,000 and 1 to 10,000.

Twenty water cultures were made, each containing one Bean and one Corn plant, which were started in soil three weeks before, and when transferred to the water solutions were four to five inches high and well rooted. For these cultures six-inch pots, holding about three pints each, were used, being painted outside and the hole in the bottom stopped with plaster of Paris. In addition to cultures in each of the sixteen solutions already mentioned, four were made in ordinary city water to serve as a check upon the others. Similar plants were also potted in soil and watered with each of the solutions used for water cultures. All were watered at once and whenever the majority seemed to need it, one of these solutions being used instead of clear water, except in the case of check plants.

The behavior of the plants under these different conditions was as follows:

In the 1 to 20 solution of alcohol: Both the Bean and Corn plant in the water culture wilted slightly within two days, but had nearly revived two days later. At the end of ten days the Corn was nearly dead, and wholly so at the end of two weeks. The Bean was alive after three weeks, but dead in four weeks. In the soil cultures watered with this solution the plants showed no effect at first, but the Bean failed to produce flowers, like most of the others. The Corn plant died within three weeks, but at the end of four weeks the Bean was still alive and slightly improved in appearance. In the weaker solutions no effect was noticeable under either method of culture. Being in open vessels the alcohol doubtless evaporated somewhat from these solutions, which were renewed about once a week.

In the one per cent. solution of corrosive sublimate in water cultures both plants were dead within two days, the Bean being bleached to the very tips of the leaves. In soil both were badly wilted at the end of two days and were dead in less than a week, the Bean dying first. In the solution one-tenth as strong, in water cultures, both plants were wilted within two days and dead within a week. In soil the plants were not visibly affected even at the end of four weeks. In the weakest solution, in water cultures, the plants wilted in a few days, but were both alive at the end of four weeks, though very light-

colored and not much larger than when placed in the cultures. No visible effect was produced on the plants in the soil.

In the one per cent. solution of sulphuric acid, in water cultures, both the Bean and Corn were wilted in two days and dead in four days, the Bean-stalk being bleached. In soil the Corn was not as large as in untreated soil, but showed no indication of dying at any time during the experiment. In the next solution at the end of two days the Bean in water culture was badly wilted and dead in four days. The Corn was slightly wilted in two days and dead in ten days. No visible effect was produced on the soil cultures. In the weakest solution no visible effect on soil cultures, and the water cultures only slightly less vigorous than those in pure city water.

In the solution of arsenic (one-tenth of one per cent), the plants in water were wilted in one day and both were dead at the end of two days, but no apparent effect was produced upon those in soil. In the weakest solution the plants in water were badly wilted after two days, but lived for some time. At the end of four weeks the Bean was dead and the Corn light-colored and not growing. In soil the Corn was smaller at the close than that under ordinary conditions, but its color was good.

In the aconite solution (1 to 1,000) both plants in water were wilted in one day, and continued so during the second day, but at the end of four days had revived. Plants in soil were not affected. All the plants continued their growth during the four weeks that the experiment lasted, the Beans blossoming and forming pods the same as those treated with city water. In the weak solution of aconite results were precisely the same.

In the strychnine solution (1 to 1,000) both plants in water wilted in a day. The Bean was badly wilted the second day, and died within three weeks. The Corn soon revived, and at the end of four weeks was nearly as vigorous as that in city water. In soil cultures the plants were not affected. Plants treated with the weak solution behaved exactly the same as those treated with aconite.

Plants in the aconite and strychnine solutions wilted even sooner than those in corrosive sublimate and arsenic, but, with one exception, revived in four days, while the latter were dead in two days. Additional plants taken from city water and placed in aconite and strychnine cultures after the first plants had revived did not wilt.

The experiments seem to suggest the following conclusions:

1. Irritant poisons, such as arsenic, corrosive sublimate and sulphuric acid, kill plants in water cultures in a very short time, except in .01 per cent. solutions, and in such solutions plants were less vigorous than in city water.

2. The neurotic poisons, alcohol, aconite and strychnine, killed no plants, with the exception of the very strong solution of alcohol, and one plant treated with strychnine.

3. All the poisons used, except alcohol, affected Beans more quickly and more severely than Corn. Alcohol, on the contrary, affected Corn more than Beans.

4. The poisons produced much greater effects in water than in soil cultures.

The strongest solutions of aconite and strychnine contained only one-tenth of one per cent.; hence it is possible that a stronger solution might have a different effect, yet the same strength of arsenic and corrosive sublimate killed plants very quickly. These results are more striking when it is remembered that from twenty to forty times as much arsenic or corrosive sublimate is required to prove fatal to animals as of strychnine sulphate. The irritant or corrosive poisons, however, attack and decompose tissue; hence may be expected to injure plants as well as animals. The neurotic poisons, on the other hand, effect only the nerves of animals, and are, therefore, less likely to injure plants.

Agricultural College, Lincoln, Neb.

F. W. Card.

Meetings of Societies.

Meeting of the Iowa State Horticultural Society.

THE thirtieth annual meeting of the Iowa State Horticultural Society, which met in Des Moines on December 10th, was largely devoted to fruit-growing. The subject of Plums received much attention. The opinion prevailed that the most profitable varieties for Iowa are those belonging to the Americana and Chickasaw types. Mr. Silas Wilson, of Atlantic, said: "It may be interesting to many of our people to know that many of the Americana and Chickasaw varieties of plums have sold in the markets of Denver and Salt Lake City in competition with domestica varieties, bringing fifty to sixty cents a peck, while those of European origin were begging at twenty-five to thirty cents a peck. There can be no question about

the value of the Americana and Chickasaw varieties for culinary purposes as compared with those of the domestica type." Of the Americana type he placed Wyant first because of its productiveness and quality; Hawkeye second, a fine large plum of good quality, which produces a better tree than Wyant. He also considered the De Soto, Forest Garden, Rockford and Wolf excellent. Of the Chickasaws, Milton should be placed first, the earliest of all of our native plums, ripening at Atlantic July 10th. Second place should be given to Charles Downing; quality excellent, a good keeper, with a fine color. Of European plums, the Tutge, a seedling that originated in Benton County, Iowa; the Communia, originated in north-east Iowa, has been before the public a much longer time. Mr. Wilson insisted that in order to grow good large plums of the native sorts there should be little fear of giving too high cultivation or too much manure, as no fruits seem to respond more readily to high feeding than our native Plums.

Mr. H. A. Terry, of Crescent City, in a paper on "Propagation of Plums," considers the Hawkeye, De Soto, Hammer, Wolf and Wyant best of the Americanas; Milton and Charles Downing best of the Chickasaws. An extensive grower of commercial Plums, J. G. Berryhill, of Des Moines, thought the season of plums could be prolonged by introducing the Japan varieties; some of those now grown in Iowa do not mature their wood; in fact, these are still experimental in Iowa. They are good growers and produce good fruit. He considers the Miner a most profitable Plum, but it will not bear if planted by itself. It needs to be associated with some good pollen bearer, like Forest Garden or Wyant. C. L. Watrous also testified to the superiority for Iowa, at least, of our native Plums over the foreign kinds. C. G. Brackett, as director of state horticultural experiment stations, found that foreign kinds met with little favor at most of the experiment stations. They are subject to black-knot and bear but little.

Of Grapes, the old varieties, Concord, Worden and Moore's Early, still meet with most favor. Mr. Elmer Reeves stated that the best general-purpose grape is the Worden. He thought, however, that in the state of Iowa more money can be made in growing cherries and strawberries than by growing grapes of any variety. Mr. M. J. Wragg estimated the net profit from an acre of Grapes in six years at \$140, while the net profit from an acre of Cherries the same length of time was estimated at \$1,087. The best Cherries for commercial orcharding in Iowa are Early Richmond, English Morello, Dyrhouse. Of the Russians, Cerise de Ostheim, Bessarabia, Brusslar Braun have met with most favor, especially in north Iowa.

The subject of Top-grafting the Apple in Commercial Orchards was considered by William Bomberger. It is a well-demonstrated fact that the hardiness of variety may be very materially advanced by top-working. R. P. Speer, of this society, has strongly advocated this method for several years. The Ben Davis, Arkansas Black, Jonathan, Grimes' Golden, Fameuse, not hardy in central or northern Iowa, are productive, and withstand natural influences much better when top-worked on Duchess, Hibernial, Virginia Crab or Tetofsky. Account must be taken of the growth of the variety which is top-worked. Mr. Bomberger says, "In producing the trees it would be best to confine operations principally to the Virginia Crab, but on light prairie soil Haas is good, and to it could be added the Duchess to work slow-growing varieties upon, as Red June, Early Joe, Wealthy, and for moderate growers Benoni, Dyer." He advocated the use of top-working in town lots that will admit of but few trees. The entire fall list could be on one tree, as Wealthy, Haas, Snow; the summer list could be grown on another tree, as Duchess, Red June, Sweet June, Benoni; the winter list on another, as Ben Davis, Jonathan, Grimes' Golden and Janet. A pleasing lot of combinations can be made, not only in regard to color but flavor and time of ripening.

Professor J. L. Budd, in a paper on The Management of our Hill Soils, said the tree rows or small fruit-rows should run at right angles to the slope of the hill. Hence the rows may be straight or curved, depending on the character of the slope. Hill land may so vary in slope that the rows may be straight at one point and curved at another. The cultivation is all in one direction. If the slope is quite abrupt, Currant or Gooseberry bushes can be planted between the rows to form a network of roots to prevent the water of heavy rains from breaking through the ridges. In south-east France this is called "zone planting." While it may not be necessary in many parts of Ohio to practice zone planting, the writer said it could be used with advantage on the Missouri slope, and more attention should be given to it so that moisture and fertilizing elements can be saved. In his annual report he referred to the unusual

drought conditions and its effects upon the quality of the fruit, as follows: "Over the state, and, indeed, over all the prairie states, where the fruit was not destroyed by the May freeze, all orchard fruits set a full crop. But at picking-time the size and perfection of the fruit were varied by soils and subsoils to an extent not before observed. Trees standing on porous soils and subsoils down to the water-level gave crops of large and perfect fruit with unusual high color, but they did not keep as usual, unless they were picked early." But on soils underlaid with blue clay or hardpan too near the surface, Cherry and Plum trees showed more or less imperfection of foliage, and the fruit was small and imperfect.

Professor Herbert Osborn, in a paper on Spraying in Theory and Practice, said that kerosene emulsion can be used in condensed form in winter for scale insects, and the possibility of the invasion of the San José scale should lead all orchard districts to be prepared to meet it. Professor Pammel's paper treated of botanists and botanical discoveries of the last decade. He said that horticulturists have been specially benefited by the study of fungous diseases and the discovery of effective germ killers. They have also been greatly benefited by the discovery of such botanical facts as the appropriation of atmospheric nitrogen by leguminous plants.

Recent Publications.

Window and Parlor Gardening. By N. Jönsson Rose. With illustrations by the author. Charles Scribner's Sons.

This neat little volume is correctly described in its subtitle as a guide for the selection, propagation and care of house-plants—a subject well worth a handbook, since it is perfectly true, as the author states, that the practice of growing plants in windows and apartments is one of the most rational and instructive of home amusements. Many people undertake to grow house-plants, and the fact that a large proportion of them make discouraging failures is proof that some plain instruction is needed in the principles which underlie success in the art. Mr. Rose's book begins with a few pages on plant physiology, with instructive illustrations, and then follow chapters on the various appliances needed, on the methods of growing plants from seed and from cuttings, with full directions for giving proper supplies of water, light and air. Then follows a list of the plants which will thrive best in living-rooms, with a description of their appearance and habits and special needs. The reader will find here many plants which are rarely seen in windows, but which will thrive as well as a Geranium; indeed, one of the most useful features of the book is this invitation to test unknown or neglected plants for windows, for the trial of new things will give a zest to the pursuit that nothing else can furnish. The cultural directions are plain and judicious, and they have evidently been prepared by one who has experience and who writes out of the abundance of experimental knowledge. Very rarely does a book of this size contain so much direct and helpful instruction, and, no doubt, its neatly printed and well-illustrated pages will help to make many a home more pleasant and cheerful.

Notes.

The California Wine-makers' Association have sold eighty-five per cent. of the dry wine of the present year's crop at prices which yield a good profit to the growers. This is the first time for years that there has been a combination between the makers of wine and the growers of grapes, and the result is a profit for all and the avoidance of glutted markets.

Gilbert White writes in *The Natural History of Selborne* that when timbers were wanted to repair the bridge at the Toy, near Hampton Court, there were found in a small wood in Selborne, consisting of a few—we wish he had told just how many—acres, twenty Oak-trees of the dimensions called for, namely, fifty feet long and twelve inches in diameter at the little end. Indeed, several of them were found to answer the description at sixty feet long. The trees were cut probably about 1745, and it is interesting to know that a century and a half ago Oaks of this size were sold at twenty pounds apiece.

Dandelions were opening on the sheltered lawns in the parks and gardens of this city wherever the sun shone on Christmas

and several days during the holiday week. Of course, Chick-weed, which is another immigrant, was showing its white flowers, but it does this almost any day in winter when the thermometer is above the freezing point where it is in a sheltered and sunny position and is not covered with snow. During the past week, however, the flowers have been unusually abundant, the bright green foliage of the prostrate stems being starred all over with little white blossoms which look so delicately beautiful that one almost forgets that the plant is a disagreeable weed.

Several varieties of the European Chestnut have come into cultivation in this country during the past few years, among them the Numbo, which is sometimes said to be an offspring of our native Chestnut and sometimes of the Japanese species, but it is really European. The burs are usually single, and this is, perhaps, one reason why the nuts are so large. The Numbo will weigh two or three times as much as the so-called Spanish chestnuts, and it is, therefore, more popular. The Paragon will average about twice as large as our ordinary wild chestnut, and it is a most promising variety.

The New York Gardeners' Society was regularly organized in this city on December 21st by representative private gardeners from Long Island and many other sections of this state, New Jersey and Connecticut. The following officers were elected to serve one year: J. M. Logan, president; William Plumb, Charles Webber, Peter McDonald, vice-presidents; William Anderson, treasurer; J. I. Donlan, secretary. A committee to draft rules and by-laws was formed, with William Falconer as chairman. The next meeting will be held on Saturday evening, January 4th, at 51 West Twenty-eighth Street, when all private gardeners who care to join an association for mutual advantage and the advancement of horticulture are invited to be present. Such an association ought to be useful in many directions, and it ought especially to be helpful in giving variety to future flower shows in this city, which have hitherto mainly consisted of plants and flowers exhibited by commercial growers to the exclusion of the rarer plants and well-grown specimens which are alone to be found in private collections.

But 2,000 boxes of Florida oranges have reached this city thus far against 500,000 boxes during the same term a year ago, when the crop of that state was estimated at 6,000,000 boxes. With half the crop frozen on the trees the season closed abruptly early last February, whereas the previous season Florida oranges were in our markets nearly the year through—from September 20th, 1893, to August, 1894. The few now offered cost \$3.50 to \$5.25 a box at wholesale, fully double the prices of last year. The main portion of the West India crop, amounting altogether to 400,000 barrels, has already been sold in the United States. Jamaica oranges are now commanding prices so high as to make rather slow sales, \$4.50 a box being asked for the best repacked fruit by wholesale dealers. The crop of the Valencia district, in Spain, is variously estimated at 3,000,000 to 6,000,000 cases, which contain 420 to 714 oranges each. This fruit has recently been in unusual demand here, large lots selling readily for \$5.50 a box, while Sicily fruit, rather immature and unsound, brought about one-third as much. The Sicily crop is said to reach fully 10,000,000 boxes. Car-loads of Navel and seedling oranges are now coming from California, and, although some of the fruit is as yet lemon-colored and tinged with green, it is of good weight and quality and promises well for the ripe fruit later on. The total production in California is estimated at three and a half to four million boxes.

The California fruit-growers who ship their products to San Francisco complain that they made no profit last year because of low prices, although fruit at the commission-houses and retail stands has been dearer in that city than it was in New York or any of the large eastern cities. They complain that when the market is glutted tons of choice fruit are dumped into the bay by commission men to maintain prices, so that California really produces hundreds of tons that are never marketed. In New York the truck-farmers and market-gardeners are making this same complaint against the middlemen. One of them lately stated to a correspondent of *The Tribune* that Long Island celery, for which they received from sixty cents to a dollar for a dozen bunches containing six roots each, are sold at retail for a hundred per cent. profit, and the same is true of cauliflower, turnips and other vegetables which come into the Gansevoort market in hundreds of wagons every night. The complaint of the farmer is that the greengrocers combine and hold off from buying until the farmers are forced to accept any offer, so that they can return home for another load, and that the expenses for stands, for stabling, etc., eat up all the

profits. On the other hand, the grocers lay stress on their high rents, losses through credits, and particularly on the deterioration of vegetables on their hands, since they are so perishable that in summer the losses from wilting and decay amount, perhaps, to twenty-five per cent. of what they sell. There is no question, however, that for such perishable articles as fruit, vegetables and milk, consumers in cities pay extravagant prices when compared with those which the producers receive. The wastes and expenses of distribution are enormous, and it is a fact that the consumer could pay much less for what he uses and the producer receive more for what he raises, while a reasonable profit would still remain for the middleman.

There is much uncertainty about the origin of the Apple now known as Tompkins King and formerly called King of Tompkins County. Some people hold that the original Tompkins King tree stands at Jacksonville, six or seven miles north-east of Ithaca, and in a recent lecture to one of his classes Professor Bailey showed a picture of the tree, now about sixty years old and two feet in diameter at the ground. It was plain, however, that the tree had been grafted, and, therefore, it cannot be the genuine seedling. It was brought from Dutchess County to Rockland County by the early settlers, where it was known as the Flat Spitzenburg, and it came originally from New Jersey, though from just what point no one knows. In Tompkins County the tree became best known, where the fruit is large and showy, and would rank ten in the scale of quality in any apple exhibition. It does not thrive, however, over as great an extent of territory as many other apples. The tree is broad, the apples are heavy and they are likely to fall in heavy winds. It is not as productive as the Baldwin and some other varieties. The fruit is borne on the outside of the tree, so that when it comes to be picked it does not fill so many barrels as other varieties do which make less of a show. The trees, too, are short-lived. They begin to die at the base and the bark peels off in strips. Professor Bailey has observed in some places where Baldwins and Greening trees are just in their prime that the Tompkins tree is already going to pieces. It is not so short-lived, however, in Tompkins County and in the adjoining region as it is in other parts of the country. Professor Bailey is not prepared to say whether this failure is due to climate or some varietal weakness, but the fact is that it is an apple of comparatively local merit, and is most profitable in this particular section of New York state. It is almost entirely unknown south of Mason and Dixon's line and west of Michigan.

The showiest pears now offered in the choicest collections of fruits are Forelles, from California, known also as German Trout pears. They are of medium size, a clear yellow, with brilliant red cheek, and sell for fifty cents to one dollar a dozen. Another pear sure to attract attention is Block's Acme, specimens of which weigh as much as two pounds each and measure fourteen inches around. These immense pears are uniformly pyriform, crisp, sweet and slightly musky in flavor. The sun-ripened fruit shows a glowing red on the exposed side, but these midwinter specimens, which were gathered before they were ripe, are olive and russet colored. They cost \$3.00 a dozen. Winter Nelis, Winter Seckel, Easter Beurre and Beurre d'Anjou are also seen in the best shops. Catawba grapes from the Lake Keuka district, this state, fresh-looking as when gathered more than two months ago, cost but twenty-five cents for a box holding nearly three pounds. Cornichon and Emperor grapes, from California, are becoming scarce, and command thirty-five cents a pound for the best. Heavy-shouldered bunches of rose-tinted Almerias, weighing two pounds and more apiece, sell for thirty-five cents a pound. Luscious-looking Gros Colman grapes, from England, the immense clusters cut with a section of the woody vine, sell for \$2.25 a pound. Other beautiful fruits which now add to the rich and attractive displays are hot-house Mandarins, from Hackensack, three to five on a stem, with fresh-looking foliage, and costing \$2.50 a dozen. Oranges from Jamaica, with stems and leaves, bring \$1.50 a dozen. Beautiful pineapples, from Florida, with luxuriant-looking tops, are \$1.00 each, and persimmons still come from the same state. The choicest vegetables are no less delicate and bright than the fruit. Hot-house tomatoes are coming from Pennsylvania, and slender stems of asparagus about as long as a finger, from along the Hudson River. Asparagus is also being received from California. Domestic and foreign nuts in large variety increase the interest of high-class fruit-stores, such as that at the corner of Sixth Avenue and Fiftieth Street, where, besides well-known and rare nuts in the shell, the meats of almond, hickory and pecan nuts are kept in stock. These all cost seventy-five cents a pound.

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What is Forestry?

THE question is often asked us what the word forestry, which appears now so frequently in American periodicals and newspapers, signifies in its technical acceptance. Judging by the number of different things this word is made to stand for, its meaning is not generally understood in the United States, where the term forestry is made to cover any and all operations in which trees play any part whatever, with the exception of those of the lumbermen, whose business it is to turn them as quickly as possible into money.

Forestry is the art of maintaining and perpetuating forests. It is successful in proportion as the forest yields the largest annual income in perpetuity. Forestry is not the planting of trees in parks or in the streets of cities. A man who sets a wind-break on the western prairies is not a forester, although it has become the fashion in this country to call him so, just as the man who lays out the flower-beds in one of our cities bears the official title of city forester. A knowledge of trees does not make a man a forester any more than a knowledge of grasses makes a man a good wheat farmer. A landscape-gardener may know trees perfectly, from his point of view, but his point of view is not that of the forester, the one planting for beauty, the other for profit of a more tangible character. The word is certainly used vaguely, and this vagueness, by confusing the whole subject in the popular mind, increases the difficulty of those who are working to establish a scientific system under which forests in the United States can be successfully and properly managed.

Forestry as a branch of scientific agriculture is less than three centuries old, although in Japan silviculture in a restricted sense has been practiced for more than a thousand years. Its importance, however, to the welfare of the community is considered so great by the most enlightened nations that men of first-rate ability have found reward in bringing this art in a comparatively short time to its present standing of almost an exact science. In Germany and France no other branch of agriculture is more carefully studied and practiced, and, in the long run—that is, in periods of centuries—no other pays a larger return upon the invested capital.

In this country we have wasted in less than a century enough forest to have supplied for all time a considerable part of the world with lumber, just as we have robbed through ignorance much of our best arable land of its fertility. What seemed boundless wealth of natural resources has made us reckless, and wealth has melted away before we realized what the end was to be. It is fortunately easier to restore plant-food to exhausted soil than it is to build up a forest once destroyed. The Carolina phosphates have brought back the lost fertility to many cotton fields of the south, and the wheat fields of western New York now produce a larger average yield than those of the Willamette Valley, in Oregon, which men not many years ago boasted were to be productive forever. The wasted forest, too, can be rendered productive again, and it is within the possibilities of science not only to do this, but to make any forest more productive, and, therefore, of more value, than it could have been without the intervention of forestry. Just as the care of the gardener makes the fruit-tree more productive of fruit, the care of the forester makes the timber-tree more productive of timber. When we come to realize that forestry is just as important a part of the economy of the nation as wheat-growing is, and understand what forestry really means, we shall certainly attempt to take advantage of the experience of other countries and adopt those general principles of forest management which they have found successful. The great difficulty we have to encounter in this country, however, will be the establishment of a continuous management free from political interference and uninterrupted by current events. A forest crop may take from one to three centuries to come to maturity. During all this period, if it is to earn a fair return, it must be managed consistently under a plan made before the seeds are sown and intended to cover every operation in the forest, including its regeneration when the original trees have passed to the saw-mill.

The necessity of permanency, the idea that a forest can and should last and continue productive for all time, cannot be repeated too often in discussions of this subject; and if the Government of the United States decides to manage the forests on the public domain in the hope that their productiveness in timber will increase rather than diminish, the public must understand that forestry is not possible unless it is permanent and that politics will destroy the best forest as swiftly and surely as it will destroy the efficiency of an army or a navy.

DURING the year past we have commented on efforts in several states to furnish to farmers, and especially to fruit-growers, instruction which is at once practical and scientific. Some of this work has already proved to be of substantial value, and all of it is promising. Not altogether novel in character, but with some distinct features of its own, is a project of the New Hampshire College of Agriculture and Mechanic Arts, from which circulars for a non-resident course of study under the title of Home Classes in Agriculture have just been sent out for a second year. This is nothing more than a phase of University extension, which recognizes the fact that since few persons can go to college, the college, so far as practicable, will go to the homes of the people. What the New Hampshire College definitely proposes is this: If ten or more persons in any grange or agricultural organization will read certain books and pamphlets on different subjects named in the list the college will furnish one or more lectures upon such subjects, provided the simple expenses of the lecturer be paid. The books will also be furnished at a reduced rate.

It is very often the case that the isolated lectures at institutes produce little permanent good, because the hearers come with no special preparation in that line of thought, and although they may be amused they fail to get the full benefit of the teaching. On the other hand, a long reading course is alarming to the majority of people, so that the present proposition offers a medium between these

extremes, giving the people of each locality an opportunity for a short course of study on one or more subjects in which they are specially interested, with the use of a few books at small cost and the privilege of instruction from a specialist to whom they can apply for such particular information as they need. Books are named for courses of reading on the following subjects, and others will be added as the circumstances demand: Apple Culture; Small Fruits; the Principles of Agriculture; Vegetable Culture; Field Crops; Dairying; Soils and Tillage; Floriculture; the Enemies of Crops. There can be no question that a class of men and women, whether young or older, who enter with seriousness into such relations with the college faculty and with the books they recommend, will derive immediate practical benefit in their calling, and, what is of much more importance, they will receive a mental stimulus and enlargement of thought which will give them more accuracy of observation and breadth of view.

Japanese Lilies as Articles of Food and Commerce.

LILIES possess the quality of combining beauty with gastronomic value; indeed, in Japan they are considered even more useful than ornamental, and in books on horticulture and botany we find these plants treated more frequently under the group of edible than of ornamental subjects; that is, far more account is made of the bulbs of the Lily than of its flowers. I do not mean that the beauty of the many varieties, in their manifold shapes and sizes, in their rich coloring of crimson, pink-vermilion, yellow, white, purple and orange, is not appreciated by us; far from it, and not a flower garden is regarded complete without them. At the same time, there never is a well-chosen menu which does not include this bulb among its dainties. Moreover, from time immemorial we find Lilies thus mentioned, both for their utility and beauty. No wonder, as different varieties grow wild and luxuriantly on hills and along dales throughout the length and breadth of the country, our forefathers could but notice their flowers, conspicuous even in the rich flora of Japan, and a little examination could not fail to convince them of the abundant store of nutritive material in their bulbs. According to Miquel, and to Franchet and Savatier, there are no less than seventeen Japanese species of *Lilium*, but these include a large number of varieties.

The Ainu, an aboriginal race supposed to have once inhabited the whole country, but now confined to a few scattered hamlets on the northern islands of Hokkaido (Yesso of older maps), where they still subsist by fishing and hunting, depend for their vegetable diet chiefly on the bulbs of *Lilium Glehni*. From the bulb of this plant, called *Turep* in their language, the Ainu extract a comparatively pure kind of starch. This they make into a hard cake with a hole in the middle, through which a string is passed to hang it by. We can easily imagine that our ancestors may have done likewise, since many varieties flourish in the south, although the climate and the soil there are not as favorable to the growth of Lilies as are those of the Hokkaido, whether we consider the color or number of the flowers or the size of the bulbs. On Hokkaido we often meet with a stalk bearing as many as thirty flowers, and that without any fertilization. Especially where there is moisture do they thrive well. By the side of brooks, which are found everywhere in the mountainous districts of the country, our eyes are constantly greeted by the various members of this charming family. Even in their wild state the flowers of *Lilium auratum* attain a size of over six inches in diameter. The bulbs of nearly every variety are edible, but those of wild growth always taste sweeter than those under cultivation. It is said that over one hundred different varieties were known to the gardeners of past centuries, though at present only a little over half that number are cultivated.

The two kinds most used for culinary purposes are the

Lilium tigrinum, known here as the Oni-yuri (literally, the Ogre Lily), or Ryori-yuri (the Cooking Lily), and the *Lilium concolor*, var. *parchellum*. This latter is also called Hime-yuri (the Princess Lily). Chemical analysis has shown that we have not been deceived in our appreciation of this plant. It proves that the bulbs contain no small amount of nitrogenous matter. I will here give the result of the analysis made at the Government Sanitary Bureau:

Water,	69.630
Nitrogen,	3.402
Fat,	0.015
Starch,	19.100
Dextrin,	1.915
Glucose,	0.620
Pectose,	2.444
Fibre,	1.416
Ash,	1.350

Total per cent., . . . 98.587

From this table it is clear that the Lily-bulbs furnish an important source of nutriment. A little plot of six feet square can be made to yield from sixty to seventy bulbs, and at this rate an acre will produce some eighty thousand bulbs. There are produced, according to official statistics of 1888, four hundred and thirty thousand pounds of bulbs in the market gardens of Japan, valued at nine thousand and three hundred yen. These numbers do not and cannot include those raised in private gardens. In price they range from half a cent to two cents apiece, according to their size and to the season. They are usually boiled and eaten with sugar; otherwise they would be too bitter to be palatable. When they are boiled soft they remind us of beans, both in their consistency and taste. The bitterness seems to lie especially along the edge of the bulbous scales; and, consequently, by slicing the edge before cooking greater sweetness is insured. The bulbs are also very often boiled with rice. The starch made from them will keep indefinitely, and was, therefore, in former times, stored to ward off the sufferings of famine. The variety *Longiflorum*, Thunb., called the *Teppo-yuri* (the Gun Lily), otherwise known as the *Riu-kiu-yuri*, because of its supposed original habitat, is esteemed for its flowers, but its bulbs are too bitter for kitchen uses. They give, however, starch of excellent quality. A variety known as *Aka-kanoko*, which grows to the height of four feet, with flowers spotted crimson, has bulbs of a purplish color, bitter, and altogether unfit for cooking, but furnishing starch of no mean quality. The best way to cook the bulbs for the American table is, we have found from experience, to boil them and use them as salad, with a dressing of cream and eggs. The small bulblets that appear at the axils of Lily-leaves can also be eaten roasted, and the petals of some varieties growing wild in Hokkaido make an exceedingly pretty salad.

This reminds me that some years ago a Harvard professor said that the future food-supply of America could be greatly and advantageously increased by acclimatizing foreign, and especially Japanese, edible plants. I was, therefore, pleased to hear, recently, that the Department of Agriculture has been circulating reports regarding the cultivation and culinary uses of Lilies. But, as it will take some time to naturalize them in America, the importation of bulbs will not at once be perceptibly decreased. In fact, these bulbs have for some years been an article of export to Europe and America, and we at one time thought that they would soon become naturalized abroad, and were afraid the trade in them must soon cease, but thus far it shows no diminution. Take, for instance, the amount exported from but one firm in Yokohama, the Ueki-shokai, in 1890—some 913,880 bulbs were sent out, including thirty-one different varieties. Among them the so-called Mountain Lilies (*Yama-yuri*) were by far the most important, their number amounting to 550,569. The next most important variety was the Gun Lilies (*Teppo-yuri*), and these amounted to little over 136,000.

The following table gives later statistics of the extent of foreign trade in Lilies, as exported from the country at large:

COUNTRIES.	1894.	1893.	1892.
Australia.....	1,550 Yen*	185 Yen....	610 Yen.
France.....	1,308 "	485 "	281 "
Germany.....	11,261 "	5,562 "	2,620 "
England.....	29,630 "	38,754 "	17,948 "
Hongkong. ...	4,328 "	6,480 "	2,166 "
United States..	19,410 "	12,679 "	9,461 "
Other countries,	737 "	1,283 "	392 "

Total, 68,224 Yen. 65,428 Yen. 33,478 Yen.

The Yama-yuri, mentioned as playing such an important part in exportation, is of wild growth, and, although its good qualities are appreciated at home, the Japanese consider it inferior for table use to the Ryori-yuri, and the demand for it here is not so great as for the latter. During an epidemic of cholera a few years ago it was, however, sold in large quantities to supply the deficiency of starchy food in the market.

The readers of GARDEN AND FOREST may be interested to know what care is taken in raising the bulbs. In October or November, when the stems of the Lilies wither, the bulbs are gathered; but, as they are too small for trade in this natural state, and, moreover, as they are so often more or less bruised when dug out, they are planted in a garden to undergo artificial cultivation for a year or two—a process of fattening, as it were, for the market. Those designed for export to European countries require particular care, since they must endure the heat of the Indian Ocean during their journey. Then, too, European taste demands large bulbs, and plants with about twenty flowers, which only bulbs of two years' artificial cultivation can bear. Americans, on the contrary, like smaller bulbs, and desire plants that bear only half a dozen flowers. Bulbs of one year's rearing, therefore, meet their wishes; but these die the next year, and hence the regular annual exportation of new bulbs to the United States.

The Yama-yuri is indigenous to Kadsusa, Shimosa, Sagami and other central provinces. The transplanted bulbs, reared in a rich garden mold, become quite strong after a year's growth, but those intended for food are not allowed to flower. Sometimes, when the soil is not of the proper kind, the bulbs, though they may grow large in size, are decidedly inferior in weight. Perhaps on this account they do not do well in Europe, except in the Netherlands, the classic land of bulbs. Some of our best bulbs measure a foot or a foot and two inches in circumference, and weigh as much as a pound. I may state here that for choicest cooking only the twelve best scales are selected from a bulb; indeed, usually eight or nine scales only are taken from each. The size and shape of the bulbs are most remarkably affected by the time when the flower buds are nipped; and some Lily gardeners think the right choice of this time is the most difficult and delicate part of their labor. When the bulbs are harvested, they are cleaned and then packed in boxes large enough to contain forty or fifty. In price, they range for export trade, according to size (taking for granted that the quality remains the same), from 2.20 to 2.50 yen per hundred for the largest; 1.20 to 1.50 for the next size—of, say, ten inches in circumference; and 60 yen or so for bulbs of a year's growth, which are usually about eight inches.

In view of the fact that the Lily, at least according to Dr. Hehn (*Cultivated Plants and Domesticated Animals in their Migration from Asia to Europe*), came from Media by way of Armenia and Phrygia, and that it now has found its entrance to America, it is interesting to note that the annual importation of the same plant from Japan completes the circle, as it were, in its journey round the world. Dr. Hehn's opinion as to the original habitat of this plant is by no means a conclusive one. His arguments are founded chiefly on philological affinities, and, though I in no wise assume to contradict his assertions, I may serve him

and the public by furnishing a few further linguistic statements which may possibly suggest that the original habitat of the Lily is still further east. The English word "Lily" comes from the Greek "leiron" (White Lily), which in turn is derived from the Persic "laleh." When we take into consideration the absence of the sound of "L" from the Japanese language and the substitution of "R," does "Yori" become unlike "laleh"? "Yori" in its turn gives place to "Yuri." Such a variation will seem the more likely when we remember that in our language the change from *ra*, *ri*, *ru*, *re*, *ro* to *ya*, *yi*, *yu*, *ye*, *yo* is of very frequent occurrence. Moreover, we observe that Dr. Hehn derives the Greek "krinon" (Colored Fire Lily) from the Persian Susa or Shushan. Now, in the oldest Japanese records the Lily is called Sai, from which Sai-yuri. In some districts it is called Saku or Sasa, thus nearly approaching Susa. This philological digression may amount to little; but I wish only to pass it on for what it is worth to those better authorized than myself to speak in that line of inquiry.

Sapporo, Japan.

Inazo Nitobe.

Populus heterophylla.

UNDER the name of black poplar the wood of this tree is now manufactured in considerable quantities in southern Alabama and in some parts of the Mississippi valley and is used as a substitute for yellow poplar (the wood of *Liriodendron*) in the manufacture of cheap furniture and the interior finish of houses. The Swamp Poplar, as this tree has usually been called, is one of the most interesting Poplars of North America, where there are no less than nine species. Although one of the rare trees of the Atlantic seaboard, it was the first American Poplar known to science, it having been described in the *Natural History of Carolina* as early as 1733 by Mark Catesby, who published an excellent figure of a sterile branch. It long remained, however, very imperfectly known, and its true position among the species of the genus was not established until Professor Britton correctly described the structure of the flowers in 1887. One of the remarkable things about this tree is the bark of large trunks. On other Poplars the mature bark is divided into broad rounded, more or less connected, ridges, which are roughened by small, closely appressed scales, but the bark of *Populus heterophylla* is broken into long, narrow plates, attached only at the middle and sometimes persistent for several years, so that an old trunk resembles that of a Shellbark Hickory. This peculiar bark is shown in our illustration on page 15 of this issue, made from a photograph of a tree in a swamp of the Wabash River in southern Illinois, for which we are indebted to Dr. Jacob Schneck, of Mt. Carmel, Illinois.

Populus heterophylla is a tree often eighty or ninety feet in height, with a tall trunk from two to three feet in diameter, and short, rather slender branches, stout branchlets, marked with elongated pale lenticels, and filled with a thick orange-colored pith, and large, slightly resinous broad acute buds. The leaves are broadly ovate, short-pointed or rounded at the apex, heart-shaped, truncate or rounded at the broad base, which is usually furnished with a deep narrow sinus, and are finely or coarsely crenate with small incurved glandular teeth; they are thick and firm in texture, dark, rather dull green on the upper surface, pale and glaucous on the lower, from four to seven inches long and from three to six inches broad, turning dull yellow or brown in the autumn before falling. The flowering aments appear from March at the south to the beginning of May at the north; those of the staminate tree are broad, densely flowered, about an inch long, and erect when the flowers first open, and then gradually become pendulous by the elongation of the thick peduncle, being sometimes when fully grown two and a half inches in length. One of their peculiarities is the brittleness of the rhachis, which, as Professor Britton has pointed out, is easily broken by the wind before the ament has attained its full length; the scales are narrowly oblong-obovate, brown, scarious, divided at the apex into numerous long, thread-like red-brown

* A yen is equivalent to an American silver dollar.

lobes and fall as the ament lengthens. The aments of the pistillate tree are slender, pendulous, few-flowered, and from one to two inches long with thin glabrous stems; their scales, which are concave and enfold the flower, are linear-obovate, brown and scarious, laterally lobed, fimbriate above the middle and caducous. The ovary is ovoid, terete or obscurely three-angled, with slightly concave sides crowned by a short stout or elongated style, deciduous from the fruit, and by two or three much thickened and dilated two or three lobed stigmas, and is surrounded at the base by the thin and scarious wide cup-shaped deciduous disk, which is irregularly divided into numerous triangular or linear acute teeth. In maturing the fruiting aments become erect and from four to six inches long and the petioles half an inch in length. The capsules ripen in May, when the leaves are about a third grown, and are ovate, acute, dark red-brown, rather thick-walled, two or three valved, and about half an inch long.

The most northern place where *Populus heterophylla* is known to grow naturally is in a swamp near North Guilford, Connecticut. It grows also near Northport, Long Island, on Staten Island, and southward near the coast to southern Georgia, through the Gulf States to western Louisiana, and through Arkansas to south-eastern Missouri, western Kentucky and Tennessee, and southern Illinois and Indiana. In the North Atlantic states the Swamp Cottonwood grows in low wet swamps and is rare and local, but becomes more common in the South Atlantic and Gulf regions, and is abundant in the valley of the lower Ohio River, in south-eastern Missouri, eastern Arkansas and western Mississippi, growing to its largest size on the borders of swamps with the Texas Oak, the Swamp White Oak, the Red Maple, the Sweet Gum and the Sour Gum. Apparently it has not been found yet anywhere in Florida, although as it is common on the delta of the Mobile River in southern Alabama it might be expected to grow as far east, at least, as the valley of the Apalachicola River.

Populus heterophylla was introduced into European gardens before the end of the last century, and is still described in nearly all catalogues of trees cultivated in Europe. It probably, however, is exceedingly rare there as it is in cultivation in this country. Planted a few years ago into the Arnold Arboretum, it has proved perfectly hardy in the climate of eastern Massachusetts, but, like other cultivated Poplars, it suffers seriously from insects boring in the trunk and branches.

Foreign Correspondence.

London Letter.

ANONA CHERIMOLIA.—A pot-grown plant of this, the Cherimoyer of the Andes of Ecuador and Peru, fruited this year in the Palm-house at Kew, and on its being noted in *The Gardeners' Chronicle* attention has been called to its merits as a useful fruit-tree by several who have essayed its cultivation in this country and elsewhere. It was the subject of some interesting observations in the *Kew Bulletin* in 1887, where it is described as a tree fifteen to twenty feet high, with loose, spreading branches and ovate velvety leaves. The fruit is about the size of an ordinary hen's egg, and it has a leathery skin inclosing a rich brown-yellow firm pulp. As in most plants which have been a long time under cultivation, there are numerous varieties, more or less differing as regards the size and character of the fruit, but it is generally agreed that the Cherimoyer is the most delicious of its kind, the flesh being firm, of a flaky character, and possessing a slight agreeable acidity mingled with a luscious sweetness. The flowers are pendent and velvety; they are generally closed in the day and open at night, giving out a delicate odor like that of *Magnolia fuscata*. The Cherimoyer is common in the mountains of Jamaica, and it is said to have been cultivated from time immemorial

in Chili. It is also cultivated in Madeira, whence the fruits are sometimes sent to the English market. It also grows and fruits freely at a high altitude in Ceylon. There is abundant evidence of its being adapted for cultivation in the open air in subtropical climates such as that of Florida and other of the southern states, and that it will fruit under glass has been proved at Kew and elsewhere. I tasted a fruit produced at Kew and am, in consequence, able to endorse all that has been said in its praise as a dessert fruit. The Creoles say that it is the most delicious fruit in the world. Cultivated on somewhat similar lines to those which are successful for the peach, the Cherimoyer would probably soon take a prominent place among favorite fruits. A figure of a plant in fruit is given this week in *The Gardeners' Chronicle*, where it is stated that in Constantinople the fruits are obtainable from December to February.

SARDA MELON.—Last year seeds of this interesting Melon were distributed from Kew among the principal gardens of the colonies and England. They had been obtained from Kabul by Dr. Aitchison, who stated in the *Kew Bulletin* for January that in western Afghanistan this variety is grown as a field-crop and is exported to India in great quantities during the winter, where it is much appreciated. The word Sarda means cold, and it appears that the fruits of this Melon only develop the rich flavor for which it is held in high repute in India when exposed for a time to a comparatively low temperature. The fruits collected from the plants while the season is hot and there is still no frost, are, comparatively speaking, of ordinary quality, but when the night frosts set in they are covered to prevent their being frozen, and are collected when not quite ripe. They then ripen slowly, keep well through the winter and improve in flavor the longer they are kept. Fruits have been grown this year in the Queen's garden at Windsor, and Mr. Thomas, the gardener, speaks highly of them. They were nearly a foot long, yellowish, netted, and the flesh was yellow, firm, very sweet and of good flavor.

ABERIA CAFFRA.—Attention has recently been called to this plant in colonial and English papers on account of its usefulness for fences and also for its edible fruits. When I was in South Africa nine years ago I saw some excellent fences of it, yards in thickness and absolutely impenetrable, owing to the number and strength of its stout straight spines, from two to six inches in length, which clothe the interlacing branches. It appeared to be as accommodating as the common Quick (*Cratægeus*) is in this country and to grow as rapidly. Its fruits are spheroid, an inch in diameter, yellow when ripe, with a juicy acid pulp and an agreeable odor. At the Cape it is known as the Kei Apple, from the Kei River, in Caffraria. It is used for jam-making, and Professor Macowan, in a note recently published in *The Cape Journal of Agriculture*, says that mixed with tomato it would make a first-rate jam. It fruits annually in Mr. Hanbury's garden at Mentone, on the Riviera, whence samples are sometimes sent to Kew. The raw fruit is too acid for most palates, although this acidity is reduced by overripeness. The plant is easily multiplied from seeds or cuttings.

QUEENSLAND CHERRY.—There are so very few edible fruits in Australia that the discovery of this quality in a species of *Antidesma*, native of that country, is noteworthy, especially, too, as this genus belongs to the Spurge-worts (*Euphorbiaceæ*), an order exceptionally poor in edible-fruited species. *A. Dallachyanum*, the species under notice, is a shrub which, according to Mr. Bailey, who described it, has "fruit equaling in size that of large cherries, with an acid flavor like that of red currants, and, like them, capable of being made into a rich-colored refreshing jelly, grateful to the parched palates of persons suffering from fever." Fruits of this plant have lately been received at Kew. *A. Bunius*, a native of Java, also yields edible fruits used for jam-making. The Queensland Cherry would be worth a trial in the southern states. Seeds of it could be obtained from New South Wales.

APPLE, BLENHEIM ORANGE.—This is one of the best three apples grown in English gardens, the other two being Cox's Orange Pippin and the Ribston. The history of the first-named is somewhat remarkable. It was told recently at a plant exhibition in Oxford, and is as follows: "Mr. G. Kempster, who lived at the end of the last century at Woodstock, in Oxfordshire, when a young man, discovered a plant growing in a crevice in the window-sill. He carefully removed and planted it. In due time it became a tree and bore apples, which were at first called Kempster Pippins, and which were so fine and of such excellent flavor

LOMARIA GIBBA, var. BLECHNOIDES.—A supposed bigeneric hybrid Fern has lately been sent to Kew by Mr. A. MacLellan, of Newport, Rhode Island, who says it is from *Lomaria gibba*, crossed with *Blechnum Brasiliense*. There is no reason why such a hybrid should not occur, these two plants being much more closely related than is indicated by their names. On the other hand, *L. gibba* is a variable plant, and I incline to the view that this and other supposed hybrids of the same kind are merely sports from that plant. At Kew there are plants of *L. gibba* which are as broad in both barren and fertile pinnæ as the *Blechnum* and others showing



Fig. 2.—*Populus heterophylla*.—See page 13.

that they soon became famous. In 1811, the gardener at Blenheim, the residence of the Duke of Marlborough, near Woodstock, placed some of the apples on his Grace's table, and he so highly approved of them that the name was changed to Blenheim Orange. The original tree was standing in 1826. In September, 1822, five apples were gathered from it weighing from fifteen to twenty-one ounces." Where it thrives, this Apple is one of the most profitable; it does not fruit freely until the trees are of large size. It is good both as a dessert and as a cooking apple. It is ripe from November to February.

intermediate characters. The late Mr. T. Moore described in 1868 a seedling under the name of *L. gibba major*, which is very similar to Mr. MacLellan's plant, and it was said to be a cross between *L. gibba* and *L. ciliata*. He also refers to a cross between *L. gibba* and the *Blechnum* which occurred at Chiswick in 1870. Messrs. Veitch & Sons had a broad-leaved *L. gibba*, which was at first called *Blechnum platyptera*. This is identical with Mr. MacLellan's plant, the name now adopted for it by Mr. Baker being *L. gibba*, var. *blechnoides*. Finally, the late Dr. Asa Gray sent to Mr. Baker fronds from a Fern which he described as

tallows. "Here are fronds of a *Lomaria gibba* in which the outer fertile fronds are all *Blechnum* and the inner *Lomaria*. I send fronds of these also for comparison." Ferns display a most extraordinary disposition to vary under artificial treatment, and this is especially true of those which have long been in cultivation and are largely grown, as, for instance, *Adiantum cuneatum*, *Pteris serrulata*, *Gymnogramme calomelanos*, etc. In the face of this it is better to look upon all such seedlings as that of Mr. MacLellan's as a variety rather than a hypothetical hybrid.

W. Watson.

Plant Notes.

SCHIZOSTYLIS COCCINEA.—Many plants of the *Iris* family are useful winter-flowering subjects, and among these none are more grateful and floriferous than this bright and showy African plant, often called the Crimson Flag. In habit of growth it resembles many kinds of *Iris*, the leaves being long, narrowly sword-shaped or almost linear, equitant, springing from a fleshy rhizome. The flowers are large, sessile, eight to fifteen in a bracteate spike on tall, leafy peduncles. The color is a bright red or scarlet. The perianth consists of six uniform, acute segments, united into a tube at the base, the entire width of the limb being about two inches. The time of flowering is from October until after Christmas, the flowers remaining in perfection a considerable time. It flourishes out-of-doors in England, but as it is of little importance in this country, except for indoor use, it should be grown chiefly for this purpose in pots or for cut flowers. Late in spring or early summer the plants should be divided, from three to five buds being left on each root. These should be planted out in a bed of loose humus-rich soil six to eight inches apart. During the summer, when dry weather is prevalent, the bed should be occasionally soaked, so as to insure a robust growth. In the fall the plants may be lifted, cleaned and potted for winter use. They should be kept in a sunny position in a cool greenhouse, where they will flower without forcing, some coming earlier, others later, thus giving a succession of flowers for months. After flowering the plant may be left in the pots and stowed away in a frame or cool greenhouse until the time comes to divide them and plant out-of-doors for the next winter's use.

Cultural Department.

Seasonable Greenhouse Notes.

PRIMULA FORBESII is a charming little plant for cool greenhouse decoration in winter, its delicate yellow-throated lavender flowers, borne in verticils from ten to twelve in each on scapes a foot or more in length. The scapes stand erect during the opening of the first few umbels, and in this condition they are very serviceable for bouquet work. Later, unable to support the weight of flowers, they arch gracefully over the sides of the pots, making charming subjects for the front row of the conservatory. The plants are tufted, with fiddle-shaped leaves, slightly pilose. The whole plant is covered with a delicate white larina. *P. floribunda* is another tender species, a fit companion for *P. Forbesii*, with yellow flowers, also in verticils, or whorls, in erect scapes. Both are easily raised from seeds, and usually enough are found scattered under the benches, self-sown, where they seem to thrive, if anything, better than under pot-culture. Some self-sown plants are growing on the walls of the Violet-house, and really it is hard to tell where they get their support from.

Here in America, for some reason, we have not generally made the true *Heaths* a success. They are frequently seen, but it is seldom any but *E. Caffra* and *E. Melanthera* succeed thoroughly. It is argued that the true *Heaths* not being natives of the North American continent, our climate is unsuited to them, and, furthermore, the peat necessary in their cultivation must be such as is obtained from moors where they abound, and this cannot be obtained here. The most successful growers import their peat from Europe. The varieties already named will grow almost anywhere and succeed well in common loam in the open garden, providing plenty of water is given them during the growing season. They also

lift well in the autumn, which is another advantage. One thing must be remembered, that a period of rest must intervene before the plants are brought into bloom. After this they force fairly well, but I have noticed that such as have been brought in early have lost the greater part of their lower foliage.

Antirrhinums have recently been added to the florists' stock in trade. The purchasing public appreciate them, and they have proved a profitable acquisition. It is evident, however, that considerable selection will be necessary before they are thoroughly adapted to the florists' needs, just as we have had to do with other plants which are properly herbaceous, as *Carnations* and *Mignonette*. It seems to me the ideal variety is one which does not develop more than ten or twelve flowers on a raceme. More flowers would require more energy from the plant, which would mean fewer flower-stems; besides, the lower flowers on a large raceme would wither before the upper buds open, and in this way a large number of extra buds would be worthless. The dwarf varieties will probably come soonest into favor, and already we have one white variety, *Star of the North*, fairly well fixed, coming true from seed.

Grevillea robusta in a small state is one of the handsomest foliage plants we have. Its graceful Fern-like leaves and pyramidal habit make it an acceptable plant in any grouping. It is equally useful for bedding purposes, and helps well to break up the monotony of a too even piece of summer bedding. It can also be used as a centrepiece in any circular design. Seed sown now will germinate in five to six weeks in an ordinary greenhouse, and the young plants grown in pots should make pretty plants from one to two feet high by next winter. It is seldom the plants remain in presentable shape for more than two years, and they can hardly ever be pruned back into acceptable plants. It is better to raise a few seedlings every year. Good loam and ordinary cool greenhouse treatment are all they need. *G. Hillii* is a very distinct species, but little known. It is much slower in growth. We have a handsome specimen now four years old and five feet tall, just a single cane, but with foliage down to the pot; the leaves have a distinctly classical cut. They are widely and irregularly pinnate, staghorn-like, deep shining green on the upper surface and covered with a closely appressed, shining, silver-gray pubescence on the under sides, as also are the upper part of the stem and the young unfolding leaves. It is a peculiarly effective plant when used singly in church decoration, being very effective under artificial light.

Dracæna australis is a common but acceptable plant when small, and I know of plants that have been used in a dwelling-house window for a year which have scarcely lost a leaf. Seed is cheap and germinates freely in an ordinary greenhouse temperature in about five weeks. Good soil, good drainage and plenty of water are the only requirements. Young plants, however, do not lift well when planted out. They should always be established in pots first; afterward they will hold the original ball of earth.

Our French *Cannas* have been repotted after a season of comparative rest, though, really, they have been growing all the while, but slowly. Now, started in a higher temperature, they will soon make strong stems and bloom finely during the spring months. Those who have roots of good varieties of French *Cannas*, and can find room, will lose nothing by growing them through the winter; all the growth made is so much gain. We have never known any constitutional injury to result, and our plants have invariably bloomed well during the succeeding summer.

Wellesley, Mass.

J. D. Hatfield.

Euphorbia Jacquinæflora.

THESE showy winter-flowering plants have been in bloom for the last four weeks, and their long wreaths of bright orange-scarlet bracts still retain their beauty and are a cheering addition to the greenhouse flora at this season. The plant may be used to good advantage as a climber if planted in a permanent situation against a wall or pillar, well cut back after flowering and freely encouraged to grow through the summer. A method usually more convenient is to grow it in bush form in pots or boxes. For this purpose we raise young plants from cuttings every spring. The old plants may be cut down and grown on a second year, but the young plants always prove the more vigorous and produce much finer flower-sprays.

For cuttings, well-ripened wood should be chosen. They strike better in an intermediate than in a warm house, and as they suffer easily from damp are better placed in an open propagating-bed than in a close propagating-frame. If they are to be flowered in boxes the one shift after striking will suffice. If intended for pots they will require about three shifts. We find boxes more convenient for their growth, but

they cannot always be used to the same advantage for decoration as plants in pots. Thorough drainage is in all cases essential, as the plants require plentiful supplies of water during the growing season, and thrive best in a rich fibrous soil. They should be planted out-of-doors in June for the summer. At first they will require a little protection, but when hardened off a little may be fully exposed to air and sunshine. They will require pinching back once or twice to get them to break, but this should not be overdone, as a few fine long shoots are preferable to a number of smaller ones. A plant with four or five shoots generally proves the most satisfactory.

Tarrytown, N. Y.

William Scott.

Notes on Garden Vegetables.

WITH one week's exception, the weather of December was abnormally mild, and outdoor gardening operations could be carried on without hindrance. For two weeks we had an entire absence of frost or precipitation of any kind, and the ground was as dry as it ever is at seed-time in early April. It is unusual to see tree-planting, digging, plowing and similar operations in full progress on both Christmas and New Year's days, but I observed quite a number busily employed on such work during holiday week. But trying weather must be near, and winter protection should be made ready for everything which needs it. This is the best time to complete digging, trenching, draining and road-making operations. We like to dig and enrich all the ground possible at this season, as it gives the vegetable garden a neater appearance, improves the ground by allowing the frost to penetrate and pulverize it, and greatly lessens the strain in spring. While the ground is open a fresh plantation of Horse-radish may be made at leisure. Onions seem to do fully as well on the same land year after year; we have known them to succeed without a change for over twenty years. As a general rule, however, a rotation of crops is advisable. With plenty of ground at command, this is more easily carried out than where the space is limited; in our own case, by trenching a piece of ground each year, and thus practically renewing it, we secure good returns.

Our perennial borders have recently had a mulching of well-rotted and broken-up manure, for herbaceous plants, with hardly an exception, like liberal fertilizing. Too often they are starved for want of it. *Helianthus multiflorus plenus* and some few other Sunflowers are doubtfully hardy here and occasionally winter-killed unless protected. We usually place a few forkfuls of leaf-mold or half-rotted leaves over the crowns of such plants; coconut-fibre refuse also is serviceable for covering Lilies and other bulbous plants, which are more injured by excessive moisture than by frost. Pansies in the open we have protected by covering lightly with leaves, over which we lay a few Spruce-branches to keep them in place. Those in frames we cover with dry leaves when hard frozen, and remove them about the end of February; it is necessary to place over them strong sashes with good glass, as the plants are liable to rot if the leaves become wet and heavy and air is not freely given. Half-hardy biennials, such as Canterbury Bells, Antirrhinums, etc., do not require any sash protection until severe frost, but they need free ventilation during favorable weather. Beds containing Tulips, Hyacinths and Crocuses should now have a coating of light strawy manure. Crocuses and Snowdrops in sheltered nooks are already above ground, and on New Year's day we noted Violets and Pansies in flower in the borders.

A common practice prevails of allowing old stools of Horse-radish to stand in gardens year after year. These become dense and the roots matted, so that they are small and tough, and the ground completely impoverished for some distance around. It is a good plan to trench out all the roots and start a fresh bed, carefully removing even the smallest pieces of root, as every one will grow. In planting a new bed we select the straightest and thickest roots, each with a crown attached, trim from them all side-rootlets, and plant with a dibble in deeply trenched well-manured ground, a foot apart each way, burying the crown three to four inches below the surface. The result will be fine crisp roots next year.

Celery in the open has kept remarkably well during the present winter; a sufficient body of leaves has now been placed on our supply to secure it from severe frosts. At the recommendation of a friend in the south of Scotland, we earthed up half a trench of Kalamazoo Celery with leaf-mold instead of the ordinary garden soil. On opening into this trench on December 24th we found it to be the whitest, most free from blemish and best-flavored celery we had. The difference between it and the part earthed up with loam is very striking. The leaf-mold, being light and more porous than loam, allows air to more easily reach the plants; there is less

danger of breaking the rather brittle stalks in using it, and it is a better frost-resister than ordinary loam. Leaf-mold is not, as a general rule, to be had in sufficient quantities on private places to use for Celery blanching, but as it can be easily wheeled away when the Celery is lifted and used for any other purpose, it is certainly worth giving a trial. So many good practical gardeners fail to carry celery through the winter that any discovery of a means to preserve it should be of service. When lifted and stored in cellars or frames a great proportion of the heads rot and the stalks lack that sweet nutty flavor characteristic of those kept outdoors where they grow.

Frames containing Parsley, Lettuces, or any of the Brassica family, need abundance of ventilation on all fine days. We look over these once a week to remove decaying leaves. A bed of leaves in which a few barrow-loads of horse-manure are mixed makes a capital bed for Lettuces, and we find no difficulty in having a supply all winter by these means. Leaves alone give a gentle heat which keeps Lettuces growing nicely. Sowings indoors of Lettuce, Radish, Cauliflower (such as forcing Erfurt) and Tomato are seasonable. The Lettuces can be transferred to frames when of sufficient size. Radishes, if no bed is at command for them, do nicely pricked off in boxes. For an early supply of tomatoes, such varieties as May's Favorite, Chemin Rouge or Comrade are very good. By the time these plants are large enough to place in their fruiting-pots or plant out the weather will be sufficiently warm to allow of their being grown in almost any ordinary greenhouse. Plants which commenced to ripen toward the end of October are still fruiting finely. In about a month we will remove these and place another batch in their places which are now in three-inch pots. Our third lot is now in six-inch pots, and will shortly be shifted into their fruiting-pots. These plants will yield a good crop in March. To make certain of a good set artificial pollination is still necessary, and decaying foliage and laterals are removed to give the plants as much sunlight as possible.

Taunton, Mass.

W. N. Craig.

Plants in Bloom at the United States Botanic Garden.

THE flowers of *Reinwardtia tetragyna* closely resemble those of the better-known *R. trigyna*, often called *Linum trigynum*. They are of a lighter yellow and much more freely produced; in fact, the plants, if not looked after, have a tendency to flower themselves to death. This species is a very desirable one for the greenhouse at this season, and it lasts quite a time in bloom. Cuttings of it should be put in during the early summer, and if given liberal treatment they will be well-furnished plants in eight-inch pots by autumn. There is nothing difficult about their culture. Old plants can be kept over, but it is preferable to take off the young shoots for cuttings and discard the old ones.

Schaueria calycotricha, better known as *Justicia calotricha*, is an old favorite which well repays a little extra attention; as a few plants of it help to brighten up the greenhouse during the dull months. The individual flowers are about an inch in length, bright yellow, the calyx and bracts being of the same color. The flowers are arranged in a terminal head. The successful flowering of this plant depends on keeping it in a healthy growing state during the summer. It is very liable to the attacks of scale insects.

Bignonia venusta can be depended on to give two crops at least of flowers during the year, the principal one with us coming in about Christmas. Where there is an abundance of roof-room in a large conservatory, this vine should certainly have a place, as it is by far the most showy of the species suited for indoor cultivation. We cannot expect to have it in a satisfactory condition if the roots are confined in a pot or tub; it should be planted out in a well-drained position, raised a little, if possible, from the level of the floor. There is no danger of the plant occupying too much room if grown to, say, one or two stems and the lateral growths kept in bounds by trimming; this operation should be gone through twice annually—once at the end of January, and again after it is done flowering, shortly after midsummer. The growths which push out after pruning should be allowed simply to hang down, because when in bloom they show to better advantage. The corymbs of flowers are both terminal and axillary, coming on the strong growths in great profusion; sometimes the shoots are covered with flowers for four or five feet of their length.

Another Bignoniaceous vine, called *Adenocalymna comosum*, is now in gorgeous bloom. The flowers, which are bright yellow, are arranged in upright racemes springing from the axils of the leaves and at the ends of the shoots. This vine does not require pruning to make it flower, but simply to keep

it within bounds, as it seems to delight in smothering everything within reach. Some of the books give its height as only ten feet; the specimen in the garden here is at least sixty feet high, and I do not doubt that it would grow twice that height if allowed to.

Washington, D. C.

G. W. O.

Notes on Begonias.

BEGONIA NITIDA has been in cultivation for more than a century and still holds its own with the latest introductions of this large genus. It is a West Indian species and was introduced from Jamaica in 1777. It flowers nearly all the year round, but is most useful in winter. At this time some large, bushy plants, from three to four feet high, are laden with pink-colored flowers. The stems are fleshy and slightly woody at the base; the leaves are four to six inches across, glossy green, obliquely ovate, and crenated at the margin. The flowers are produced plentifully in terminal and axillary panicles and are of a deep rose color. The staminate flowers measure one inch and a half across and have two broad and two narrow petals, while the pistillate ones are not as large and have five equal petals. The flowers last well when cut, and are specially useful at this season. Young plants are easily obtained from cuttings made from the young growth and root freely at any season. We find the two or three year old plants most useful, as they produce more flowers than the younger ones. In May the old plants are cut back and taken out of the pots, and most of the exhausted soil removed from the roots. They are then planted out in the garden in a shady position, where they are left until the first week in September, when they are potted and put into a warm greenhouse. When the pots are well filled with roots, weak liquid-manure is given about once a week. We use this fertilizer for all the strong shrubby kinds. For good, healthy plants and plenty of flowers Begonias need good light and sufficient room between the plants, so that air can circulate freely among them.

Begonia Gogoensis is a species with variegated leaves, introduced from Gogo, in Sumatra, by Messrs. James Veitch & Sons, of Chelsea, in 1882. This *Begonia* is valuable as a foliage plant, and when well grown makes a distinct specimen. The leaves are peltate and oval in shape and measure from six to nine inches in length. When they are young they have a bronzy metallic hue, but when older they are a deep velvety green interlaced with the paler midribs and veins. When the leaves are full grown the under side is of a deep red color. The petioles are reddish, four-angled and about six inches long and rise from a short tuberous stem. This species is now in bloom; the flowers are not showy, being small, of a rosy pink color, and produced in loose panicles on erect peduncles which raise the flower slightly above the foliage. *B. Gogoensis* is grown in an intermediate house the year through, in a slightly shaded position during the hot months of summer. It flourishes in a light, loose, rich soil.

Begonia manicata is an excellent free-flowering species, and large plants are handsome at this time with their abundant crop of flowers. It is a robust plant and easy to grow. In the latter part of May, when the weather is favorable, the plants are taken out of the pans, divided and planted out singly in the garden. Early in September they are lifted and some of them put into large shallow pans, over the edges of which the large leaves soon hang, so as almost to hide them. Large masses of this *Begonia* are more showy than small individual plants, and they have a pleasing effect now when in bloom. The short stems are clothed with smooth shining green leaves that are ovate, obliquely cordate and measure six to eight inches in length; they have many scale-like hairs on the under side. The pink flowers are produced on long peduncles and are arranged in large loose panicles. A variety of this plant grown here is named *Aureo-maculata*, and is a handsome foliage plant when well grown. Its leaves are large and glossy and prettily marked with creamy white blotches.

Another old favorite is *Begonia fuchsioides*, which has been cultivated since 1847. It makes a good pot-plant, but is in best condition when planted out in a cool greenhouse and trained to a pillar or tied loosely to a stout stake. Under good treatment it attains a height of five or six feet, and its stems are clothed with numerous ovate green leaves about one and a half inches long. The flowers are borne on drooping branched panicles and their color is a rich scarlet.

Botanic Garden, Harvard University.

R. Cameron.

Koeleruteria paniculata.—I am well acquainted with a few specimens of this desirable little tree at McPherson, Kansas. These examples are twenty-one years old; they are healthy and sound, withstanding the dry weather and the hot winds to

which they are exposed in a clearly successful manner. For about ten years they have been blossoming and bearing fruit, and are altogether very interesting.

Manhattan, Kansas.

F. A. Waugh.

Notes from the Botanic Garden of Smith College.

Lopezia coronata.—This plant is now in flower in the cool temperate house, and is certainly a most striking and beautiful plant for any cool greenhouse. The flowers are disposed in racemes at the ends of the branches; they are white, with the under side a rosy purple. The plant branches so gracefully as to give it, when in flower, a candelabra appearance. The leaves are alternate and about one inch long, ovate, with very short petioles. Clusters of smaller leaves or undeveloped branches are situated in the axils of the leaves. It is a native of Mexico and belongs to the family Onagraceæ. I find the best way to grow *Lopezias* is to take cuttings about the end of February (they root readily in the propagating bed), afterward potting them in small pots, and plant them out during summer. I lift them about the middle of September, keeping them well shaded till established. I should think this plant would make an excellent one for commercial use, either for cut flowers or pot plants, as it remains in flower several weeks.

Aponogeton distachyon.—This plant is a most beautiful subject for an aquarium in a cool greenhouse. It has been in flower in a cool house here for several weeks. The leaves are narrowly elliptical, entire, about eight inches long by two wide, and float on the surface of the water. The flower is rather remarkable, a two-spiked scape, and looks as though the scape had been split at the upper end to form the spikes. Instead of petals there are small, white ovate bracts, alternately disposed on the spikes. The pistils, which are apparently four-cleft, are situated at the base of the bracts and surrounded by a number of stamens with dark brown or purplish anthers. The flowers rise just above the surface of the water and have a very sweet perfume. It is a native of the Cape of Good Hope, and is sometimes called Cape Pondweed. Like most aquatic plants it delights in a rich soil; a good sandy loam, with plenty of rotten cow-dung, suits it admirably. It is also very essential that it be placed in a light position with an abundance of air on mild days. It belongs to the family Naiadaceæ, and is closely related to the lace-leaf plant of Madagascar, *Ouvirandra fenestralis*. According to *Index Kewensis*, *Ouvirandra* is now included under *Aponogeton*.

Northampton, Mass.

Edward J. Canning.

Correspondence.

Habits of Ferns.

To the Editor of GARDEN AND FOREST:

Sir,—If one visits the forest at this season, before the ground is covered with snow, he will find the Christmas Fern, *Allosaurus acrostichoides*, and other evergreen species with fronds procumbent. In summer these same species stand nearly upright, the fronds of *A. acrostichoides* being especially firm and rigid. As winter approaches, however, the plants become prostrate, and so protect themselves from being broken by the heavy snows and winds of the winter months.

About the middle of September I took from the woods three plants of *Allosaurus acrostichoides*, put them in pots and brought them into the house. They stood the transplanting well and proved very ornamental until about the middle of November, when these plants, like those outside, became prostrate. Cold weather could not have been the ruling factor in bringing this about as these plants were in heated rooms. It seems rather strange that this lying down of the fronds takes place at so nearly the same time with plants placed under such different conditions. It would be interesting to know if this old habit can be broken up by continued cultivation under changed conditions, and if so, how long it will take to overcome it.

Experiment Station, New Haven, Conn.

W. E. B.

North Carolina Bulbs for Forcing.

To the Editor of GARDEN AND FOREST:

Sir,—Some time since you noted the fine appearance of bulbs grown in this state and sent to a firm in New York, and remarked that though apparently much superior to the imported bulbs, it remained to be seen whether they would force as well. About the same time the firm to whom these bulbs were sent wrote to me that it was hardly worth while to grow the Chinese *Narcissus* here, for the bulbs, though very fine, would

not bloom in water as the Chinese ones do; at least, that had been their experience with bulbs grown in Bermuda. I then put some of our bulbs in water, and at the same time some of the imported Chinese. To-day our bulbs are a mass of flowers, while the imported ones are just showing buds. I have been accustomed to the forcing of bulbs for thirty years and have never seen any bulbs do better than those we grow here. In addition to the *Narcissus Tazetta*, we are forcing some of all the bulbs we grow, including various *Narcissi*, *Tulips*, *Lilies*, *Roman Hyacinths* and *Freessias*, and all, without exception, are first-class. I believe our bulbs of *Lilium candidum* will at least make twice as many flowers as the French bulbs. *Roman Hyacinths* are excellent, and *Freessias* are extra fine, though our house (we have but one) is rather too warm for them. We are confident that bulbs grown in North Carolina will compare favorably with any in commerce for forcing, as well as for any other use.

North Carolina Agric'l Exp't Station, Raleigh, N. C.

W. F. Massey.

Recent Publications.

Agriculture. By R. Hedges Wallace. Philadelphia: J. B. Lippincott & Co.

The natural laws on which profitable agriculture is based are of universal application. There is no agricultural science for America which is not true for the latitude of England or of Australia, and yet the art of agriculture varies widely when it comes to be adapted to the climate and soil of different countries. This little book discusses the science proper. Although prepared by a lecturer and examiner in the Department of Agriculture in Victoria, it treats of those broad principles which not only underlie the practice of agriculture, but gives the reasons why this practice varies under different conditions. For an American text-book it might be more immediately useful if the illustrations were drawn more generally from American plants, American crops, American machinery and American surroundings generally; nevertheless, it would be hard to put within a brief compass a clearer and more comprehensive statement of the essentials of agricultural science. Subjects of such fundamental importance as the composition of plants, their methods of assimilating food, the physical and chemical properties of soil, the effects of cultivation on land and crops, the use of natural and artificial fertilizers, the rotation of crops and many more elemental problems are so treated that the student who masters these pages ought to be able to carry out intelligently the daily routine of farm procedure. Of course, we do not expect in such a compendium any of the refinements of biology or botany or chemistry, and, in fact, these would be out of place, since the author is careful not to confuse these special sciences with the science of agriculture, the object of which is solely the production of crops and the breeding and feeding of animals. Questions are added to each chapter, and this old-fashioned method of instruction adds materially to the value of the book. Besides this, the important words which constitute the topics of a given paragraph are printed in broad-faced type, and this, although it does not add to the beauty of the page, makes it much easier for the student or for one who is hastily looking the book through to pick out the thread of the argument.

We are glad to see that this book has been put on the reading list in the University extension movements in some states where provision is made for agricultural instruction. Part of it, at least, or a book arranged on a similar plan, might well be adopted as a text-book in all the common schools of the country. It is universally admitted that the study of the natural sciences ought to have some place in every curriculum as a factor in wholesome intellectual development, if for no other reason. In our high schools and colleges the principles of astronomy are taught, not because the students expect to become expert astronomers, but simply to broaden their field of view and exercise certain powers of thought and imagination. The elements of chemistry and botany and geology and other sciences are taught largely to discipline the mind and furnish it with material for use in civilized society, and there is no reason

why the study of agricultural science should not be recognized for its value in furnishing mental training and exercise. No branch of study would have a more immediate effect in establishing habits of careful personal observation, and certainly one familiar with the elements of this science would derive a life-long pleasure from it, even if he never made direct practical use of his knowledge. One who has an intelligent idea of what is going on in the orchards and gardens, the grain fields and pastures about him in any country where he may chance to be, is more adequately equipped and lives a fuller life than he does to whom all procedures on every farm and vineyard are mysteries—mere movement without any intelligible plan or purpose.

Periodical Literature.

M. R. W. BOTTING HEMSLEY, in an interesting review of Dr. Cordemoy's recently published *Flora of Bourbon*, calls attention to the following facts:

"Bourbon is about the same size as Mauritius, from which it is now separated by about a hundred miles of sea, though it seems probable that they were joined at some remote period. The mountains rise to an altitude of more than 9,000 feet, or nearly three times the height of the highest summits in Mauritius, and the island presents a great variety of climatic conditions. . . . At 7,000 to 7,500 feet ice is sometimes found as late as November.

"Formerly nearly the whole island was covered with forest from the seashore up to an altitude of about 6,500 feet. But for half a century all the available land in the lower region has been cleared for cultivation, and the native vegetation is replaced, where not actually under cultivation, by foreign weeds. At the present day the forest region commences at 600 to 2,500 feet.

"Most of the prominent and useful forest-trees are common to Mauritius, as are all of the Palms. But what is more remarkable, few of them are found elsewhere, though many of the genera of the region extend to Madagascar. In fact, there are very few genera peculiar to either Bourbon or Mauritius, but several restricted to the two, indicating that these islands are separated remnants of a formerly more extensive area of land. On the other hand, peculiar species are very numerous in both islands. Dr. Cordemoy and his collaborators (for he has not worked out all the orders himself) describe upward of two hundred species of flowering plants as new, in a total of less than a thousand. More than seventy of these new species are Orchids, and the author expresses his conviction that many terrestrial species yet remain undiscovered, as they are, many of them, very small and inconspicuous, and their period of vegetation is of very short duration. Indeed, as it is, the number of species of Orchids enumerated is 172, or more than double the number of any other order of flowering plants. The island is also exceedingly rich in Ferns and Lycopods, which number together about 220 species. It is true that the author takes a narrower view of species than he probably would do if he were dealing with the Ferns of the whole world; but even after deducting twenty per cent. on this account there remain nearly a third more than there are in the Fern-flora of New Zealand. Not only are the species numerous, but between thirty and forty genera are represented. Tree and Filmy Ferns are present, though they do not abound to the extent they do in the far-away southern country.

"The intermediate and upper zones of vegetation comprise species of *Phillipia*, dwarf shrubby *Ericaceæ*, *Hypericum*, *Phylla* (very numerous in south Africa), *Psidium*, and shrubby species of *Senecio*, prominent among which is the endemic *S. Ambavilla*. *Faujasia* and *Eriothrix* are other characteristic shrubby *Compositæ*. Plants of an alpine character are entirely wanting. *Cardamine Africana* is the only native *Crucifer*, and *Stellaria villosa*, the only member of the *Caryophyllaceæ*. There are, however, two endemic species of *Ranunculus* high up on the mountains. *Agauria salicifolia* is an *Ericaceous* shrub or small tree common to Bourbon, Mauritius, Madagascar and the mountains of tropical Africa. Altogether it is an exceedingly interesting flora."

As early as the middle of the last century Bourbon was visited by the French botanist Commerson. The result of his investigations was not published, although his plants are still preserved in the herbarium of the Museum at Paris. In 1795 another French botanist, Aubert du Petit-Thouars, visited Bourbon, where he remained for three years, publishing, after his return to Paris, important works on the botany of this and

the neighboring islands, including Madagascar. Gaudichaud, another French botanist, visited the island in 1818, but his collections were lost in the wreck of the French man-of-war *Uranie*. Returning to the island seven years later in the *Bonite*, he subsequently wrote the botany of the voyage which, although still incomplete, Mr. Hemsley pronounces one of the most interesting of the earlier contributions to peninsular floras.

Notes.

A correspondent of *The Gardeners' Chronicle*, writing from the Botanic Garden in Grenada, West Indies, states that the Avocado pear, the fruit of *Persen gratissima*, is one of the few vegetable substances which are relished by cats. It is said that these animals will leave milk when an opportunity offers and eat this fruit voraciously.

In one of the late bulletins of the Cornell Experiment Station the Russian Thistle is spoken of as one of those weeds whose mission is to educate the farmer and ameliorate the soil. Weeds only prosper on fields which have been mismanaged, and judicious tillage and cropping will keep them down. If the Russian Thistle spreads seriously it will be because our scheme of farming makes room for it by not keeping the land in full use.

The experiment has been recently made in France of forcing Strawberries under different colored glass, with the following results: (1) The best and earliest fruit was raised under ordinary glass; (2) orange-colored glass stimulated the vegetation, but was prejudicial to the quality, size and earliness of the fruit; (3) the plants under violet glass yielded a great deal of fruit, but it was small, inferior in quality and not early; (4) red, blue and green glass all proved detrimental to the plants in the experiment.

The botanical garden at Smith's College, Northampton, Massachusetts, is only a little more than three years old, but during the past year more than one thousand trees and shrubs were added to the collection, and the same number of herbaceous plants. Five glass houses were built during the year, including a large Palm-house, so that there are now seven greenhouses altogether. The policy of the college is to make the garden primarily educational, but it is also interesting from an ornamental point of view.

During last week 8,625 barrels of apples were shipped to this city for local trade, making 505,000 barrels since September 1st, an increase of 124,864 barrels over the supply for the same period last season. The exports from this port for last week amounted to 1,734 barrels, 220,455 barrels since September 1st, and nearly 3,000 barrels less than during the same weeks last season. Northern Spies, Virginia Wine Saps and Kings sell for the highest price, \$4.00 a barrel to retail buyers, followed closely by York Imperials; Greenings, Baldwins and Ben Davis cost fifty cents a barrel less.

Among house-plants easy to manage, Joseph Meehan mentions *Begonia maculata* and *B. Saundersii*; *Ruellia macrantha*, with its large trumpet-shaped rosy purple flowers; *Ardisia*, with its clustered berries; *Cypripedium insignis*, which will thrive among other plants under ordinary window-culture and its flowers will remain open for six weeks or two months; *Rubus rosafolius*, with double white flowers; *Streptosolon Jamesonii*, with abundant orange-colored flowers in late winter, and *Libonia Penrhosensis*, which is covered with its crimson bloom throughout the winter months.

Fruit-growers in the Hudson River Valley consider the *Lucretia dewberry* as profitable as any of the blackberries, because it ripens early, and as grown there it is large, uniform in color and of good appearance, while the plants are very productive. These are set about six feet apart each way; the vines are allowed to creep over the ground and are well mulched at the beginning of the winter. Five or six of the strong shoots from each hill are tied to a stake in the spring and the rest are cut off and removed, and this insures clean fruit and protects the plants from being bruised when it is gathered.

Florida is now sending limited quantities of lettuce, cucumbers, squashes and tomatoes to northern markets, besides egg-plants, string beans and peas, the latter selling at fancy prices when choice. Lettuce is also coming from Louisiana, and new-crop cauliflower, spinach, kale and radishes from Virginia, and beets from South Carolina. Tomatoes, from California, sell for twenty-five cents a pound, and celery from the same state at twenty-five cents for a bunch of three stalks. Tender

green stalks of asparagus, fifteen inches long, a dozen to a bunch, have been credited to California, but these are grown under glass in northern Illinois. They sell for \$1.00 a bunch, and two dozen blanched shoots less than half as long, from glass houses in this state, cost seventy-five cents. The cranberry crop of the United States, while considerably larger than that of 1894, is still insufficient for home use, and some have recently been imported from Europe. Other importations are new potatoes and beets from the Bermudas, and cabbage from Denmark.

Monsieur Charles Naudin announces in the last number of the *Revue Horticole* of the year the flowering, in his garden at Antibes, of *Vigna strobilophora*, the beautiful leguminous vine discovered by Mr. C. G. Pringle in Mexico in 1893, and described by Dr. B. L. Robinson. A figure of this plant, which promises to be a first-class addition to garden vines, was published in this journal (vol. vii., page 155), and seeds collected by Mr. Pringle were distributed, through the agency of the Arnold Arboretum, among American and European collections. At Antibes the seed sown in 1894 has produced stems several yards in length, which were covered during October and a part of November of last year with racemes of purple and rose-colored pea-shaped flowers. According to Monsieur Naudin, "*V. strobilophora* will rank among the most ornamental of the Mexican plants cultivated in Europe, and will make a sensation in northern greenhouses as well as in the gardens of southern Europe, where it will be especially valuable for covering trellises and summer-houses."

Small even-sized Tangerine oranges, from California, of bright orange-red color, now bring a dollar a dozen in the fancy-fruit stores. The few coming from Florida are of uneven size, the color varying from lemon to russet, and these command the same price a dozen, as much as \$14.00 a box being obtained for them at wholesale. Tiny Mandarins, from Italy, cost sixty cents a dozen. Small shipments of unusually fine oranges are coming from Citra, Florida, and sell for \$1.00 a dozen, grape-fruit from the same section commanding \$2.50 to \$3.00 a dozen. The choicest Navel oranges from California are offered at \$1.20 a dozen. Large showy Japanese persimmons, in excellent condition, cost sixty cents to \$1.20 a dozen. California strawberries, with considerable suggestion of the luscious summer fruit, are in moderate supply at seventy-five cents a box, and the first hot-house strawberries from Hackensack, New Jersey, cost \$3.00 for a cup holding six or seven immense berries. Lady-apples, brilliant and lustrous, cost thirty to fifty cents a dozen. Lychee nuts, from China, sell for thirty cents a pound, the best pecans from Texas bringing the same price, and new-crop Paradise nuts, from Brazil, fifty cents a pound. English filberts, or cob nuts, in their husks, are also offered in the best stores, and cones of *Pinus Pinea*, each scale enclosing two edible seeds known as *Pignolia* nuts.

The highest grades of roses were among the flowers that sold most readily during the holiday season, when choice American Beauties brought \$36.00 a dozen in the retail shops. New Year's sales were more active than in recent seasons, and holiday prices were fairly maintained then, though they had fallen fifty per cent. and more by the Saturday following, when a half-dozen sprays of purple lilac cost \$2.00, the white variety bringing a third more. New carnations, as Maud Dean and Lily Dean, then commanded \$2.00 a dozen; the popular pink William Scott and deep red Meteor \$1.50, and Lena Saling and the scarlet Tidal Wave \$1.00. Mignonette has been one of the most popular flowers, the largest spikes costing as much as fifty cents each. Easter lilies have sold well at \$3.00 a dozen, and Marie Louise violets at \$2.00 for a bunch of fifty flowers. Spikes of white Swainsonia cost fifty cents a half-dozen. Other cut flowers seen in florists' collections were lily-of-the-valley, forget-me-not and heliotrope. Narcissus, hyacinths and tulips have been forced into flower in large quantities, but have failed to supersede more seasonable flowers. Among flowering and fruiting plants the most delicate, as the most showy, are thickly flowered *Ericas*. *Cyclamens* and *Primulas* of many hues and bright-colored *Azaleas* enliven the florists' windows, as do well-berried plants of *Ardisia crenulata* and *Otaheite Orange* in abundant fruit.

The death is announced, at Anhalt, Germany, in his sixty-sixth year, of Professor Hermann Hellriegel, the distinguished agricultural chemist, whose name will be associated with the discovery that organisms growing in the root tubercles of many leguminous plants help to fix the free nitrogen of the air and make it available as plant-food.

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Municipal Art Again.

A FEW weeks ago we alluded to the report of the Fine Arts Federation of this city on the location of the proposed monument to the soldiers and sailors who died in the war for the Union, for which a quarter of a million dollars had been appropriated by the Legislature. The legally appointed trustees of this monument fund had invited an opinion from the Federation, which consists of members of ten different societies in the city which are connected with various branches of the arts of painting, sculpture and architecture, and the Federation gave its reasons for considering the vestibule of the park known as the Plaza objectionable as a site. Further than this, and in order to give a definite and practical character to their views, the associated artists named another site and gave the reasons why they considered it an appropriate one. The commission did not adopt this report, but, on the contrary, voted in favor of the site condemned by the Federation. We expressed our regret at this decision, because we believe that if the city is to be made attractive by works of art these must be designed by artists of the first rank and their positions must be selected by men whose taste and training have fitted them in a peculiar way for deciding questions of this character. A committee of thirty picked men, three from each one of the affiliated societies, devoted a great deal of time and study to this subject, and no argument is needed to show that their judgment on such a point ought to be worth more than the offhand opinions of men who do not pretend to have any special education or experience to prepare them for work of this character.

The last number of *The Engineering Magazine* contains an instructive article on the Value of Good Architecture in Cities, in which it is shown how insignificant are the efforts to supply American cities with monumental and architectural adornment, when compared even with the second-rate cities of the Old World. Taking the City Hall Park of New York, for example, and the streets that surround it, attention is called to the fact that although this is a comparatively small space the buildings on the east and west are sufficiently distant from each other to escape any appearance of crowding. Not to speak of the meaningless public building occupied by the general government as a post

office at the southern end of the park, ten million dollars would be a conservative estimate of the amount expended within the last decade upon the great buildings which now look down upon the little City Hall in the centre of the green. This sum of money, if it had been expended in Paris, for example, would have probably secured for that city one monumental building and a series of structures, each one of which would have been a genuine municipal ornament. Without criticising the buildings about this park, it is safe to say that, with one or two possible exceptions, if they were all destroyed no one would feel that the city had lost any priceless art treasures; and yet this is the very heart of the municipal life of the metropolis of the New World, and it is the one point in the city where careful artistic treatment is desirable, and where splendid surroundings would be constantly exerting their influence upon the taste and ministering to the pleasure of tens of thousands of people who daily pass through it. If the contemplation of objects of art which embody noble thoughts is more wholesome than the daily contact with objects which offend the sense of beauty, then the city which does not furnish dignified buildings, monuments and statues does not live up to its opportunities and fails to minister as it should to the wants of one part of our nature.

We hear much of republican simplicity, and it is sometimes argued that buildings of impressive proportions and lofty purpose are wasteful and contrary to that utilitarian spirit which is the foundation of our material progress. But the truth is that purity of line in buildings is not at all inconsistent with usefulness, and that an ugly structure may cost as much as one which has real value as a work of art. It is not the want of money, but the failure to appreciate the real worth of architectural beauty, that makes so many of our streets commonplace and featureless. We do not mean by this that our people, as a rule, lack good taste. It is only vulgarity and snobbishness which consider anything good enough for Americans. Our national, state and municipal authorities go on constructing public buildings which not only are lacking in ordinary comfort and convenience, but which have nothing in the way of stateliness or beauty to show for the vast sums that are every year expended upon them. And yet when by some happy chance some really meritorious building or monument or fountain is set up the plain people who are stigmatized as lacking the æsthetic sense at once recognize its value and look upon it with genuine satisfaction and pride, for they are quite as able to appreciate the beauties of a well-designed park or fountain or statue or building as any in the world.

One reason why we have no more good public structures lies in the self-reliant and self-sufficient feeling of men who are elected to office, and who assume, therefore, to decide upon questions of art with the same positiveness and assurance with which they decide matters of their own private business. So-called self-made men have too little respect for expert opinion in any direction. They consider themselves able to decide all serious questions, and questions of art they are apt to consider too trivial for any study. They seem to imagine that the artistic and the practical are in everlasting conflict, and they have not begun to learn the truth that the highest art in the laying out of a park or the construction of a building is simply the exaltation of its greatest practical value. The artistic view of a question is not something opposed to what is known as the common-sense view of the same matter. For example, the Report of the Fine Arts Federation on the site of the soldiers' and sailors' monument was a document full of hard, practical sense, and it set forth reasons for the conclusions reached that any man of ordinary cultivation could weigh. The fact is that the view of artists upon such a question is nothing but the view of the educated community, only the artists by their training are able to seize upon the real points at issue and present them in an orderly way for the

approval of the intelligent public. The artists and special lovers of art in any community are simply that part of the people who have thought the most about art matters, and what is the view of the artists to-day on a question of municipal decoration would be the view of every man of ordinary cultivation in the city if the same question was properly presented to him, and it will be the popular view in a year.

Bridge over the Kent at Levens Hall.

THE bridge illustrated on page 25 is a good example of the form of construction most often seen in the north of England and in Scotland. Built of the common serviceable stone of the neighborhood, these bridges look as if they had laughed at the elements for generations, and would continue their defiance for many a year to come. On the high road between Milnthorpe and Kendal this one crosses the Kent in the park of Levens Hall, where lovers of the curious may still see the topiary marvels created by the gardener to James II. In the home grounds the gently flowing river is bordered by tall grasses, the large leaves of the Coltsfoot and great tufts of purple Loosestrife, while in the deer park trees dip to the water as it saunters past. From the lawn in front of the house the little island, on which the pier rests, makes a pretty foreground to the bridge, which rises, gray and solid, above the waving tangle of flower and sedge.

Bridges of this sort would be just as appropriate here as in the old country, and would, of course, be more durable than the wooden constructions which are every year washed away by the dozen in the spring freshets. The initial cost, to be sure, would be greater, but in the long run the stone would prove more economical, since trifling repairs are needed, and these at comparatively long intervals. Here and there, in out-of-the-way parts of this country, stone bridges are still to be seen, but the structures which are now being built are almost without exception of wood or iron. If village improvement societies would turn their attention in this direction much could be done to restore streams, now defaced, to their original beauty. The simple lines and quiet color of this Ivy-draped bridge in Westmoreland are what make it satisfying to the eye and an added charm to the stream; it is made from the stone of the country, and the native plants grow about it as familiarly as though it were a boulder playfully deposited there by Nature in the ice age.

New York.

Beatrice Jones.

The Retail Prices of Cut Flowers.

IN one of the two articles on the New York Cut Flower Company which appeared in GARDEN AND FOREST during last November, it was stated that the retail price for cut flowers in this city seems unnecessarily high to Americans who have lived abroad, where they learn to consider choice flowers a necessity rather than a luxury, and examples were given showing the relative prices of roses and violets, which here are nearly twice as high as in southern Europe. By some persons this is attributed to the large profits of the commission houses, while others hold that the retail dealers receive the lion's share of the great advance in price over that received by the grower.

The retail florists of this city number about two hundred, not including a large class of street venders known as the Greeks, and representative dealers give many reasons, which seem convincing, for the prevailing scale of prices. In the first place, it is necessary to keep so large a stock of many different kinds of flowers that the capital required is considerable. Not a few firms, founded twenty or more years ago, have a history of moderate, steady growth from very small beginnings, sometimes less than one hundred dollars having constituted the original capital. But the same conditions which have affected the jewelry, dry goods, house-furnishing and other lines of trade have revolutionized the florist's business, and now a very modest establishment

needs at least \$5,000 to begin with, while double that amount is necessary to open a tasteful and attractive store in a good location, and a first-class business in a fashionable locality cannot be successfully started without a much larger investment. Furnishings and decorations in a store are expensive necessities, which may easily take \$2,000 or more, besides the heavy outlay for horses and delivery wagons. A van, too, is a necessity, since these immense enclosed vehicles are heated and ventilated to insure the safety of tender and valuable stock, such as large decorative plants. Fancy baskets, silver bowls and artistic jardinières of many forms and all colors and shades are required in a first-class establishment, and one such house has in regular use 200 pedestals needed in the grouping of plants in decorations. While \$50.00 is a minimum daily investment for cut flowers, the largest stores handle 5,000 to 20,000 individual flowers, for which they pay from two cents to \$1.50 apiece.

Taking the year through, it is, perhaps, not too much to say that twenty-five per cent. of the stock bought is not sold, and is a total loss, and it is easily possible on many days to have half the stock represented in flowers aggravatingly removed from freshness. Roses, bright-colored and deliciously fragrant, which would furnish delightful home decoration for several days, are stored in the ice-box at the close of a day only to be just too widely blown for the next day's trade. At their best, roses and Bermuda lilies are the longest keepers, and may be successfully carried three days, while heliotrope withers and blackens in a day, and the welcome fragrance of violets becomes a death-like and offensive odor after from twelve to twenty-four hours, though their color is still clear and bright. The resentment against paying what seems exorbitant prices is, perhaps, directed more generally against violets than any other particular flower, their quiet unobtrusiveness making the price all the more startling. But these modest little flowers now cost the retail buyer \$2.00 a hundred, and it is a good business day that sees his stock of them exhausted, and anything short of this means actual loss. For example, four small bunches left over represent \$8.00 of lost capital. The critical selection of the customer leaves a dozen to twenty roses and carnations out of every hundred to be sold in a lower grade for less money, and a few lilies out of every twenty-five are sure to be bruised and, of course, made worthless whenever they are handled. All this signifies that one hundred per cent. advance in price means a much smaller profit than these figures imply. Indeed, the perishable nature of flowers makes them more uncertain than almost any article of commerce. Even the most delicate fruits and hot-house vegetables can be held over in cold storage and their appearance be preserved until they are to be eaten—that is, they do not need to be kept for a long time after they are sold, simply for appearance sake—while the duration of the beauty of flowers is their essential value.

One of the most important conditions for success is the judicious selection of stock as to variety and quantity. Twenty years ago Safrano, Bon Silene and the old white Lamarque roses constituted almost the entire variety of this class of flowers, whereas now of pink varieties alone the dealer is obliged to have at least half a dozen Tea roses and nearly as many Hybrids. Although customers do not know the names of the different roses, yet they know the distinctions of shade and form between Mrs. Pierpont Morgan, Belle Siebrecht, Madame Cusin and Bridesmaid, and insist on being precisely satisfied. If the desired variety is not on sale, telephone and telegraph are at once brought into requisition, with the result that these special flowers cost the dealer more than he receives for them. Cases like this are aggravated by the short notice now given to dealers. Formerly several days were allowed for the filling of a moderate-sized order, but now a florist must be equipped to complete the decorations for a sumptuous entertainment in a few hours. In the matter of color modern taste has come to be very exacting, since great

care is taken to select flowers of a tint which will be in effective harmony or contrast with the other decorations of a room or a table, or of a gown. Even in white the flowers must match the exact tone, whether ivory or cream or pearl, and samples of dress materials are often sent to the florists with orders. To meet these demands the larger stores are compelled to have a superintendent, skilled bouquet makers and buyers who command large salaries.

The cost of material given away nowadays would almost have paid the expenses of an ordinary flower store a quarter of a century ago. Boxes which cost fifty cents each, ribbons where cotton cord was formerly used, expensive lavender-colored tinfoil, fine papers of various textures, corsage pins, and the greens which are used for filling amount to a round sum in the course of the year. Twenty years ago a ball bouquet was made of Bon Silene roses and Ground Pine, and the regulation price of five dollars left a fair profit for the dealer. Now a bunch of choice loose flowers costs twenty-five dollars, because no culls can be used, and only perfect long straight-stemmed flowers. Where Geranium leaves were once acceptable for foliage, modern taste demands the use of expensive fronds of Adiantum and Asparagus. Then it should be remembered that the season in this city begins with the week of the Horse Show and ends with Easter, with many breaks caused by holiday visits to country places and to the south, so that whatever money is made in the year must be made within a comparatively few weeks. This necessitates for a part of the year long hours and hard work for many employees, with no holidays.

All this means high prices for the most fashionable flowers, and yet the business is making a steady and healthy growth. More flowers are sold every year, and more growing plants are used for decoration. As a general rule, too, the popular taste is becoming more refined, and not a few of the retail dealers are exerting a wholesome influence in this direction.

New York.

M. B. C.

Trees of Minor Importance for Western Planting.—I.

THE Kentucky Coffee Tree, *Gymnocladus Canadensis*, has not received the attention it deserves in ornamental planting in the United States. It is indigenous as far west as central Kansas, to my knowledge, and grows thriftily and with comparative ease even on dry upland. It is not difficult to handle in the nursery while young. The tree has in all stages of growth picturesqueness and charm. Its foliage is beautiful, and while it gives a distinct variety in the foliage-texture of any planting, it is not so conspicuous as to appear obtrusive, nor does it bring any note of disharmony to the composition. In winter, after the foliage is shed, the large, dark seed-pods persist, adding to the picturesqueness of the gray branches and making altogether such a piquant effect as an artist might long seek for. The tree is sound and healthy, and not subject to insect attacks, so that I am at a loss to understand why it is not more frequently used. Some twenty-year-old specimens recently examined in McPherson County, Kansas, have a height of twenty feet, and have been bearing seed for eight or ten years.

The Honey Locust, *Gleditsia triacanthos*, is native to pretty much the same western situations as the Coffee Tree, which it resembles in more points than one. Though the foliage is not so compoundly pinnate as in the Coffee Tree, it is much finer and gives an even more emphatic touch of shimmering tremulousness to the masses which it composes. This effect is much heightened by the glossy surface of the leaves, which reflect the sunlight at every movement, and this becomes more important in a country which has twice as much sunlight in a year as New York state. This tree thrives throughout Kansas and Oklahoma in almost all situations in which any other trees grow, though it is, perhaps, a trifle shy of the drier uplands. I have seen many handsome specimens in several western states. It is said to be attacked sometimes by borers, but I have never had evidence of serious trouble on this score.

The American Elm was omitted from my notes of western timber-trees in GARDEN AND FOREST, December 18th, 1895, because I have not seen it planted for timber. For ornament, and especially for streets, it is a great favorite in the west, though its popularity has, I think, been somewhat declining in recent years. The young trees are grievously worked by borers in many cases. I especially noted several hundred large nursery-grown trees along the streets in Norman, southern Oklahoma, which had been totally destroyed the first year, with hardly a single exception. The long, slender, exposed trunks of these trees, however, offered an unusually fine harbor for the insects. Lower-headed trees with cleaner bark should be chosen for planting, and it seems as if some other defensive measures might be adopted.

At Oklahoma City, Oklahoma, I also noted Tea's Hybrid Catalpa used as a street-tree. The trees had only recently been set from not very good stock, and so gave small opportunity for judgment; but, so far as my observations went, they helped to confirm a prejudice which I had already formed against all Catalpas for street-trees.

The American Ash has sometimes been used as a timber-tree in the west, and has, I think, been carefully tried in the well-known plantings at Farlington, Kansas. I have never seen it much used for any purpose, and the only really satisfactory record of it which I have ever made is taken from several trees which came up from seed as undergrowth in a planting of Ailanthus, Catalpas and Cottonwoods in a timber-claim in McPherson County, Kansas. In this situation they did well, and when examined a few months ago were good, straight trees of eighteen or twenty feet high. They are now twelve years old. I have once or twice seen them planted in solid blocks, without shade, in timber-claims, but I never saw them successful under such treatment. I remember also a close planting of Ash in blocks on the Kansas Agricultural College farm, and my impressions of their success as a forestry venture were not flattering; but for good reasons they had not come under such systematic and sympathetic treatment as might have developed a better showing. This Ash is also sometimes used as a street-tree, but nowhere with great success, so far as my observations have gone.

Maples have been extensively used in western towns as street-trees, the Silver Maple being in a large majority. In some places public squares have been planted with them, and the result is generally entirely satisfactory. All things considered, it is probably the best street-tree for the west, though it has its faults, to be sure. Some seasons it is quite defoliated by a lepidopterous larva, which adds a considerable unwelcomeness of its own to the unsightliness of the naked trees. But these ravages do not occur every year, and some of the people who, a few years ago, cut down fine large Maple-trees on this account were undoubtedly hasty.

University of Vermont.

F. A. Waugh.

Foreign Correspondence.

Gleichenias.

WHEN well grown the Gleichenias form handsome specimen plants. They are among the most attractive of the Ferns cultivated in the cool fernery at Kew, where the conditions as to temperature, moisture, etc., appear to exactly afford their somewhat special requirements. This house is one of the most recently erected; it is built of light iron, with wood sashes, the panes of glass ten inches wide, the roof span-shaped, with a lantern ventilator, the position being from north to south. A central stage and two side stages, the latter a yard from the roof, formed of thick slate, resting on an iron frame and covered with small coke, accommodate a collection of all kinds of Ferns which require a minimum temperature in winter of from forty-five to fifty degrees. I describe the house because it is the first of those at Kew set apart for Ferns that has proved suitable for Gleichenias.

Three years ago a collection of species and varieties of *Gleichenia*, at that time only a few inches high and planted in four-inch pots, was obtained for this house. These plants are now each from three to four feet in diameter, their stem-like fronds interlacing and forming a thick bush of elegant green, prettily crimped pinnæ.

The treatment these plants have received is as follows: They are potted in a mixture of peat, silver sand and nodules of sandstone in shallow pots or pans. The soil is pressed firmly about the roots, and any straggling rhizomes pegged down close to the soil. Plenty of water is given at all times, and this is perhaps the chief essential in the cultivation of *Gleichenias*. If a plant has lost fronds, turned brown, or made stunted growth, it has proved to be due to insufficient watering. I have been told by travelers that *Gleichenias* generally grow in sunny, dry situations in countries where they are wild, but I know from experience that under cultivation they do not like bright sunshine, and they revel in moisture at the root.

Gleichenias are remarkable in the structure of their fronds, in which respect they resemble the *Lygodiums*, several species of *Davallia* and one of *Gymnogramme*. The true stem is a creeping rhizome from which spring the fronds, which have wiry stalks, generally dichotomously branched many times, and bearing numerous elegant, deeply cut, pinnatifid branches or pinnæ. These are what are usually looked upon as the fronds proper, the long wiry portion being popularly supposed to be stems. The sori are capsular, in cups formed by the usually reflexed edges of the ultimate divisions or teeth of the pinnæ; they contain few spores, which are matured on cultivated plants and are used for their propagation. Beginners are apt to collect and sow only the spore-cases after the spores have escaped, which they do at an early stage. The pinnæ should be collected when the capsules are green and plump, and kept in paper in a dry place till the capsules burst and release the spores. They should be sown in pots of very sandy peat and covered with a pane of glass. Although the wiry growths are really the stalks of the fronds, they may be used for the purpose of multiplication, as they frequently bear axillary buds. A stock of plants can be obtained by planting a specimen in a prepared bed of sandy peat and pegging down the fronds, especially fixing the apical fork close to or a little below the surface of the soil. Many Ferns have proliferous or bud-bearing fronds, the most familiar of all being the *Aspleniums* of the *bulbiferum* type.

Gleichenias may be grown into very large specimens. I have seen them fully six feet in diameter and as leafy and healthy as a well-grown *Asparagus plumosus*.

There are about thirty species of *Gleichenia* scattered widely over the tropics both of the Old and New World, extending into Chili, Australia, the Cape, etc. Some of the handsomest, especially of the truly tropical species, have not yet been introduced into cultivation, although many attempts have been made. The following are cultivated at Kew and in other gardens in England:

G. circinata.—Rhizomes covered with black-brown scales; stalks of fronds brown, clothed with gray wool; pinnæ (fronds) six to eighteen inches long, dull olive-green above, silvery below; the segments linear, one to three inches long, one-eighth of an inch wide; the teeth rounded, flat, or forming shallow cups in some of the varieties, of which there are five at Kew, viz., *Backhousiana Mendelii*, *semivestita* and *Speluncæ*. These are all natives of Australia and New Zealand and have long been in cultivation.

G. dicarpa.—Rhizomes nearly glabrous; stalks brown, hairy only when young; pinnæ bluish green, the segments very narrow and divided into numerous very small rounded teeth, the margin of each of which is recurved and forms a small purse-like cavity, which is partly closed with fine rust-colored hairs. This character distinguishes *dicarpa* from all the other species. The varieties of it

grown here are *alpina*, *glauca* and *longipinnata*, all natives of Australia and New Zealand.

G. dichotoma.—The stalks of this species are thin, somewhat zigzag, hairy when young, smooth and shining brown when old; they are dichotomously branched, each pair of pinnæ being subtended by a pair of smaller in the axil or fork, from which springs the continuing stalk. The pinnæ vary in length from six inches to a foot, and in width from one to six inches; they are not unlike the fronds of a *Nephrolepis*. This species is usually unsatisfactory under cultivation, but at Kew it grows well under the conditions above described. It is quite distinct from all other Ferns. It occurs in all tropical countries, and there are numerous forms of it.

G. flabellata.—Rhizomes as thick as goose-quills, olive green, clothed with black hairs; stalks erect, smooth, dark brown, unbranched for some distance, bearing a cluster of repeatedly forked pinnæ about nine inches long, flabellately arranged, more or less parallel and gracefully arched; the teeth are half an inch long, shining dark green. There is a large specimen of this very striking Fern at Kew. It is a native of Australia and New Zealand, where it sometimes forms masses many feet through.

G. rupestris.—Stalks of fronds thin, wiry, glaucous when young, smooth; pinnæ as in *G. circinata*, but with thicker, rounder teeth, and always quite flat; they are glaucous green above, silvery below. Var. *gigantea* has the segments nearly a quarter of an inch wide and is a noble Fern; var. *glaucescens* is more distinctly glaucous than the type. Native of Australia.

London.

W. Watson.

Plant Notes.

Leucothoë catesbæi.—Certainly few people can realize the winter beauty of this shrub or it would be more often seen in northern gardens. The flower-buds are developed in autumn in the axils of the persistent leaves of the year, and are formed like elongated pointed cones, about half an inch in length, with closely imbricated scales. As the weather grows cold the scales turn deep red, the same color suffusing in a slighter degree the ends of the zigzag stems and the upper leaves, and their petioles, vigorous young branches and their leaves being often as richly colored as the flower-buds. The lower leaves for the most part retain their brilliant lustrous green color, and the contrast between the upper and lower parts of the plant only adds to its beauty. *Leucothoë catesbæi* is a shrub with recurving stems from three to six feet in length, persistent, tapering thick and leathery leaves, and short spike-like racemes of nodding waxy bell-shaped flowers. It is a common under-shrub in the region of the southern Alleghany Mountains, where, from Virginia to Georgia, it inhabits the moist banks of streams, usually growing in the shade of trees. It was one of the earliest of the Appalachian plants cultivated in Europe, and English gardeners soon learned its value. It has always been propagated in English nurseries, but in this country has remained comparatively rare in gardens. It flourishes in damp situations and in peat soil, growing equally well in the shade and in full sunlight and is beautiful throughout the year. When it is desirable to unite the margins of a plantation of evergreen trees or large shrubs with the ground, or to plant the shaded banks of a brook flowing through a rocky gorge, there is no better plant for the purpose than this Alleghany shrub, which possesses a constitution that enables it to bear uninjured the severe climate of New England. All the North American *Leucothoës*, of which half a dozen are distinguished by botanists, are first-rate garden plants; and they are all easy to cultivate, with the exception, perhaps, of the beautiful *Leucothoë Davisæ*, which inhabits the high Sierra Nevada of California and has not yet been satisfactorily tested in our gardens, although it was introduced into England as long ago as 1853 by the collector Lobb. Like many other California plants, however, it is difficult to manage in the east, and probably will never become a popular garden plant here.



Fig. 3.—Bridge over the Kent at Levens Hall.—See page 22.

Cultural Department.

About Currants.

THE marked development in recent years of the interest in currants as a market fruit has naturally been accompanied by the introduction of many new varieties and some old varieties under new names. The newer candidates for favor include the Eclipse, North Star, Red Cross and Wilder of the red kinds, and Marvin's Seedling, Caywood's Seedling and White Versailles of the white kinds, and several other sorts. None of these have been fruited here long enough to determine their productiveness.

North Star, introduced from Minnesota, makes a vigorous upright or somewhat spreading growth. The color of the fruit is much like that of the Red Dutch; bunches medium length; fruit probably large under good cultivation, but varying from small to large. Red Cross, from seed of Cherry fertilized by White Grape, was originated by the originator of Brighton Grape. The fruit is medium to very large, milder-flavored and lighter in color and somewhat later in season than Cherry. Habit of bush, upright, vigorous. Eclipse is a good grower and bears bunches from two and a half to three inches long. The fruit varies from small to large; color good, somewhat lighter than that of Fay; flavor comparatively mild. Wilder, from seed of Versailles, originated about eighteen years ago with Mr. E. Y. Teas, Irvington, Indiana. It is a good grower, bearing fruit medium to very large, less uniform in size than Fay, and somewhat lighter in color. It appears to be worthy of extended trial as a late kind.

Among the red Currants that have been in full bearing at this station during the last three years, Cherry has been one of the most desirable of the large-fruited kinds. Fay yields longer bunches and more uniformly large fruit than Cherry, but it does not make as satisfactory a bush, nor has it been as productive in this locality as the Cherry. Neither of these kinds will remain on the bushes in good condition for shipping as late as will Victoria, Prince Albert or Wilder. On account of its thin skin and abundance of fine-flavored juice, Cherry is liked at fruit-preserving establishments for making into jam, but it is necessary to evaporate away more of its juice in making jelly than it is with some other varieties. Fay and Prince Albert are especially liked for making into jelly, because of their large size, thin skin and rich pulp.

Prince Albert is a vigorous grower, more upright even than Red Dutch. When well grown the fruit will pass for large. Of all the varieties in full bearing here during the last three years it has given the highest average yield, and London Red, also known as Short-bunched Red, has taken second place. The London Red, like Cherry, has short clusters, with stem so short as to make it difficult to pick. The fruit varies from medium to large and is similar to Red Dutch in color and quality. One of the most valuable of the kinds that produce medium-sized fruit is Victoria, also known in Canada as Ruby Castle or Ruby Castle. The bush is a very strong grower, upright and very productive. The cluster of well-formed buds at the end of the shoot, the bluish gray color of the buds and the rather pale green foliage are quite characteristic of this variety. The clusters are of good medium length. The fruit is late in coloring, has a bright red color, and will keep on the bushes in good condition later than either Cherry or Red Dutch.

The market demand for white currants is quite limited, and the number of new white varieties is not so great as the number of newly introduced red sorts. White Grape and White Dutch still remain the standard sorts. White Imperial has not yet fruited here. Caywood Seedling is a very productive white kind, with spreading or drooping branches. The fruit is large, attractive and of good quality. Marvin's Seedling is similar in color to White Grape, larger in size and rather more acid. White Versailles has long, well-formed clusters slightly darker in color than White Grape; berries larger, less juicy and about the same in acidity as White Grape.

Geneva Experiment Station, N. Y.

W. P.

How to Grow Peppers and Egg-plants.

THERE are few vegetables which so often disappoint growers by failing to produce fruit as Peppers and Egg-plants. It seems to be an easy matter to grow plants which by the last of August are large and vigorous, but in many cases only an occasional plant is productive. Conditions of soil, climate and culture might cause such failure, but I think it is most often the outcome of little-understood peculiarities of Solanaceous plants. The Tomato, Egg-plant and Pepper are annuals and natives of a tropical climate. The seed does not

start until the growing season, and then the plants have the advantage of a uniformly favorable degree of moisture and heat, in which they grow rapidly and steadily from the starting seedling to the ripening fruit. This is their normal habit of growth, and any interference with it is sure to result in less perfect development and fruitfulness. A temporary check, which would have no permanent influence on Peas, Beans or Lettuce, will materially lessen the fruitfulness of a Tomato, Pepper or Egg-plant, even though it does not lessen its ultimate size and apparent vigor. I could give details of experiments which go to prove this fact, but readers will recall instances where a single volunteer Tomato-plant which sprang up after the started plants were set, and in the favorable weather grew steadily without check, was noticeably more productive, though no larger, than those that were transplanted. If individual plants of Egg-plant and Pepper are noted, those which have grown most steadily and been least checked in transplanting will prove the most productive plants. The practical lesson of these observations is that the utmost care should be taken in starting plants of this class to secure steady and unchecked growth.

Sowing the seed should be delayed until there is just time enough before setting the plants in the open ground for the seedlings with a moderate rate of growth to reach the size most desirable for handling and transplanting. Special care should be taken to so control light, heat and moisture as to secure the steady growth of the plants. To start the seed so early or grow the plants so rapidly as to be forced to hold them back or let them get soft and spindling through want of room is sure to result in a poor crop of fruit, no matter how promising the plants look in July. The ground should be well prepared and so fertilized as to give the plants a well-balanced food ration, and the plants set and the ground cultivated so as to avoid, as far as possible, the least check in the growth of the plants.

Detroit, Mich.

Will W. Tracy.

Freesias.

AMONG winter-blooming plants which furnish flowers for cutting few equal in usefulness or popularity these Cape bulbs. Within the last few years the price of flowering bulbs has been so much reduced that they are now sold at very low rates, and no one possessing a greenhouse can afford to be without them; we have seen very good pots and pans of them grown in windows where the temperature has not been too high. A great many house-plants are ruined by heat, and Freesias are impatient of high temperature until their flower-spikes show, when they will endure a little forcing. If opened in strong heat, however, the flowers lack the substance of those grown cooler, and they fade sooner.

For our earliest batch, from which we usually begin to cut flowers at Christmas, we plant our bulbs about the middle of August, using boxes four inches deep, well-drained with broken crocks or clam-shells, over which is placed a layer of sphagnum-moss. The compost used consists of equal parts of loam, leaf-mold and well-rotted cow-manure, with a good dash of sharp sand and some pulverized charcoal to keep the whole porous. A box twenty-four inches by twelve inches will carry fifty bulbs. These are covered two inches deep with the compost; after being boxed a good watering is given and the boxes are placed on a bed of ashes in a cold frame and covered with some strawy manure to prevent the drying out of the soil. As soon as the young shoots appear this covering is removed; the sashes are only used over the plants to throw off heavy rains, and, later in the season, to protect from frost; the more steadily the plants are kept growing the better will be the returns at flowering time.

We house these first lots early in October, and place the boxes on a shelf in a Carnation-house close up to the light. From the beginning of November until the flowers commence to open, stimulants are applied at each alternate watering. We find sulphate of ammonia and sheep-manure water the best liquid foods, and we use these almost as strong as for pot Chrysanthemums. Freesias, if well grown, should average from twelve to twenty inches in height when in bloom, with four to five side branches on each spike; the starved specimens too often seen average from six to nine inches in height, and are ruined by too much heat, being grown too far from the glass and in too poor compost.

By putting in a few boxes of bulbs each month from the middle of August to the middle of November a succession of bloom may be had from Christmas till Easter. We hold our late batches in a cold frame until Chrysanthemums are quite over. Freesias increase about three-fold each year, and home-grown bulbs, we find, produce much finer flowers than

the larger ones from California. After the flowers are cut we place the boxes under the benches and gradually withhold water. About the middle of July we shake the soil out and pick the bulbs out in two sizes; the smaller ones, like garden peas, are sown broadcast, rather thickly; these make fine flowering bulbs for the next season. For use in the conservatory, *Freesias* grown in pots or pans are very effective, their delicate odor and free-flowering properties making them indispensable. By sowing seed in pots or pans and thinning them out (as the seedlings cannot be successfully transplanted) good flowering bulbs may be had the second season, but bulbs of good quality are now so cheap that few go to the trouble of raising them in this way. *Freesia refracta alba* is the most largely grown and popular of the three sorts in commerce. *F. Leichtlinii*, with creamy yellow flowers, may be added; stray bulbs of it are usually to be seen mixed in with those of *F. refracta alba*.

Taunton, Mass.

W. N. Craig.

Oxalis versicolor.

THE trouble with most of the species and varieties of *Oxalis* lies in the fact that their flowers remain closed for a considerable portion of the day; especially is this the case in mid-winter, when some of them only open in clear sunny weather. Few of the species are very attractive unless they are in full flower. The species known as *O. versicolor*, however, is a notable exception to this rule, as the flower-buds and closed flowers are quite as attractive to many people as the fully opened ones. The petals, when closed, are so arranged that they overlap each other to a certain extent, the overlapping edges of the under surfaces being a reddish pink color, and the remaining part white and greenish yellow at the base, and this combination of color in the closed flower makes it very attractive. When expanded the flowers are about an inch in diameter, and upper surface of the corolla is pure white. This species is not of robust growth; the leaves, which are small and divided into three linear leaflets, do not spring directly from the bulb; long slender stalks are first produced, which form bunchy growths at the apex, from which spring an astonishingly large number of leaves and flowers. The plant is particularly well adapted for planting in baskets, as the branches hang over the sides. It begins flowering here about the middle of December, and continues for at least three months; this is in a house where the temperature is kept just high enough to prevent freezing. The pear-shaped bulbs are small, and in starting I set them singly in thumb-pots, using peat loam and sand in equal parts. When the growths are an inch or two high they are transferred to baskets lined with sphagnum-moss, when a richer soil is used, and in this they are planted rather closely.

Botanic Garden, Washington, D. C.

G. W. O.

Notes from Harvard Botanic Garden.

IN a greenhouse here, where the temperature ranges from forty to forty-five degrees, there is a showy group of plants of *Senecio Petasites* which invites special attention. This plant is an old inhabitant of gardens, having been grown for more than three-quarters of a century, but it is seldom seen now. It is of special value at this season for those who have large conservatories to be kept gay during the dull months of winter. The plants are seldom kept more than one year, but if large specimens are desired the old plants may be cut back late in spring, and when the weather is favorable in early summer they may be planted out in the garden. They need plenty of room, as the old branches soon break and make large handsome specimens. Cuttings struck in spring make the most useful plants for us. When the plants are through flowering one or two are kept for stock plants. They are cut back, and in a few weeks they make young shoots, which make the best cuttings when they are three or four inches long. It takes them about two weeks to make good roots in the cutting-bench. After they are well rooted they are put into three-inch pots, and in May they are planted out in the garden. They soon begin to grow, and about the first week of July they are cut back so as to make them branch. They generally make three or four stems, but those stems are never cut back during the remainder of the season. If extra-large panicles are wanted, the young plants should be grown to a single stem. Just before there is danger of frost the plants are lifted, and are large enough now for eight-inch pots. As they are gross feeders they need a rich compost, and before they blossom weak liquid-manure is very beneficial.

This *Senecio* is a stout, erect plant with round stems, which

attain a height of three or four feet or more. The stems are clothed with large circular leaves, which are cordate at the base and dark green above and paler beneath. The leaves are from six to twelve inches broad, and their petioles are nearly a foot long. The large terminal panicles measure a foot and a half in length and are developed in November, but the flowers do not open until the second week in December, or sometimes later. The flower-heads measure more than an inch across, and the color of the disk florets are brownish, and those of the ray are of a bright yellow. When the plants are in full bloom they are very attractive, for not only are the flowers showy, but they are also fragrant. It is a Mexican plant, and when first introduced was known as *Cineraria Petasites*.

Half a dozen large plants of the showy *Cestrum elegans* are blooming freely now in pots. These plants make handsome objects when planted out in a bed or border in a cool greenhouse and trained to a pillar. In such a position, if properly treated, they blossom nearly all the year round. Two or three year old plants, grown in pots, we find most serviceable, as they branch more freely and are more graceful than younger plants. The season of blossoming of plants grown in pots is regulated by the time the plants are rested and pruned. When they are through flowering we find they do much better after a long rest. This rest is brought about by withholding water, and it helps to ripen the soft wood. In June they are pruned close to the old stem, leaving only one or two buds of the previous year's growth. They are then turned out of the pots, and after most of the exhausted soil is removed they are planted out in the garden. If syringed regularly they soon make young branches, and their naked and ragged stems are soon hid with green leaves. When they are taken up in the fall they need plenty of pot-room and good rich soil. They begin to blossom in December and continue for two or three months. The purplish red, tubular flowers are produced in dense terminal cymes on long, graceful branches a yard or more in length.

Eranthemum tuberculatum is a handsome species introduced from New Caledonia in 1863. At this time its pure white star-like flowers, which are about one inch across, are produced plentifully on the thick, bushy plants. They are about a foot high, branching freely into slender twigs which are thickly covered with small oval leaves. This *Eranthemum* is grown as a stove plant here, and after blossoming it is cut back and kept slightly dry for a short time. In spring it is potted in a rich open soil and the plants are placed afterward near the roof-glass, which induces them to make short, healthy growth. Cuttings made from the young growth root easily if given slight bottom heat, and they soon make nice little plants if given good treatment.

Botanic Garden, Harvard University.

R. Cameron.

Ardisia crenulata is one of the prettiest of all berried plants for winter decoration. The berries are vermilion-red, and one crop holds over until another is ripe, so that it is an available plant at all seasons. It is a shrub of very slow growth, taking four years to make a specimen a foot or eighteen inches high. This is the most useful size, since the plants afterward become leggy and need cutting down and restarting in fresh soil in slightly smaller pots. They are easily raised from seed, and usually enough self-sown seedlings are found under the benches. Ordinary greenhouse temperature is sufficient after the fruit is set, but during the blooming season a slightly higher temperature is advantageous in securing a good setting of berries. Good peaty soil and firm potting is essential, as the plants will remain in good condition for two or three years in the same pots. The plants are subject to scale as a pest, and it is only by frequent syringing with a decoction of tobacco-water and fir-tree oil or kerosene emulsion that they can be kept clean.

Wellesley, Mass.

T. D. H.

Reinwardtia trigyna.—This good old plant is now a blaze of beauty in the warm temperate house. It is rather remarkable that one so rarely meets with this plant either in private or commercial collections, yet it is just upon one hundred years since it was first discovered and sent to England. It is a sub-shrub, though it perhaps is best to take cuttings each year (unless large specimens are wanted) and throw away the old plants. The leaves are ovate, entire, and about one inch in length, alternately disposed on the branches. The flowers are of a rich golden yellow, about the size of a silver dollar, solitary in the axils of the leaves in the lower parts of the branches, but crowded at the upper ends of the branches. The petals are fugacious, which is the only drawback to the commercial

use of the flowers, but the large quantity of buds keeps the plants in bloom several weeks. It belongs to the family Linaceæ, and is also known under the name of *Linum trigynum*. It is interesting botanically in that it has three pistils, as its specific name implies, which is rather uncommon in dicotyledonous plants. Cuttings rooted in February and planted out during the summer in the open ground, kept watered during dry weather and pinched occasionally to keep them shapely, will make nice plants by fall, when they may be lifted and placed in a warm greenhouse, where they will repay the little trouble spent on them. It is a native of the mountains of the East Indies.

Northampton, Mass.

Edward J. Canning.

Correspondence.

The Prospects for California's Orange Crop.

To the Editor of GARDEN AND FOREST:

Sir,—Unless some unexpected calamity should destroy the orange crop of California, the state will send to market this year the finest and largest crop of this fruit ever gathered here. The output is estimated at ten thousand car-loads, two thousand car-loads in excess of any previous year, and comprising three million boxes. At \$3.50 a box in the east, their value will be ten and a half million dollars, approximating the gold production of California for 1894, which was about thirteen million dollars.

Shipments of last season's oranges to the east continued until late in the summer. During the week ending May 9th, 224 car-loads left Riverside, the largest shipment ever sent from any one place during the same period. The first car-loads this year went from Porterville and Oroville, in the northern part of the state, a region which has been growing oranges for some years in but small quantities. It is evident, however, that the northern Citrus belt, of which Butte County is the centre, will prove a strong competitor for early shipments and high prices, with the larger and better-known orange-growing districts more than five hundred miles to the south. Riverside sent the third car-load of oranges east this year, and Redlands the fourth. These shipments were at least three weeks earlier than the first shipments of last year. The ruling price here has been \$2.50 a box. These early oranges answer for Christmas decorations, but they were not fully ripe and not really fit to eat. No California oranges are at their best before the first of February, and, as far as establishing a permanent demand is concerned, these early shipments do more harm than good.

A vigorous effort will be made this year to market the California fruit to the best advantage, and to market it all. For this purpose the Southern California Fruit Exchange endeavored to secure control of the entire crop. The growers are naturally anxious to make the most of the absence of Florida's competition, and the Fruit Exchange, which handled about half of the orange crop last year, argued that the best way was to form a combination of all the growers in southern California, and practically to control the markets. This exchange has a central executive board, composed of representatives from eight subordinate exchanges. Its plan is to have representatives in each distributing centre of the east to watch the markets, to see that they are all fully supplied and that none are overstocked. Orders are subject to the supervision of the executive board, and shipments are to be made on a pro rata basis. That is, if the market at any given time is estimated to demand, say, two per cent. of the total crop, each district forwards two per cent. of its crop. Provision is made for meeting undesirable foreign competition by cutting prices, the consequent loss to be prorated among all the exchanges. In brief, this is a daring plan to control the marketing of a perishable product, which is not uniform in quality, like oil or sugar or coal, and the market value of which has always been determined by a number of uncertain factors. The extension of this work through the year, so as to include the shipments of green and dried deciduous fruits, has also been contemplated.

As oranges are a luxury, there can be no arbitrary fixing of the price, but it was urged that systematic coöperation among growers would develop new markets and obtain a foothold among the old ones. The possibility of this was shown by the successful work of the exchange last year, after the Florida freeze, in forcing the California fruit upon the markets of New York, Philadelphia and Baltimore. The necessity of such coöperation was argued from the fact that the growing orchards of California will, in the near future, produce from 15,000 to 20,000 car-loads of fruit a

year, the consumption of which will demand an active representation in all the markets of the United States. This would amount to four and a half to six million boxes, the latter amount being the estimated Florida crop which was destroyed by frost last year. California expects competition from Florida as soon as the latter state can grow new orchards. Land in Florida is cheap, and the probabilities are that growers will set out new orchards and take their chances of the weather.

These facts are understood in California, and certainly made a strong argument for coöperation. The plan, however, failed of support. The friends of the exchange claim that they will ship this year about sixty per cent. of the entire crop of the state. Its opponents state that not more than forty per cent. will be handled by it. There are several principal reasons for the partial failure of this plan. The first is the competition between localities in southern California. The quality of the fruit grown here depends upon climate and soil, which vary to an extent that an eastern man can hardly understand. The principal orange-growing region of southern California is within a belt not more than one hundred miles in either direction, and within this territory there is a wide diversity of climate. The best oranges are grown in the interior, away from the fogs and dampness of the ocean, and at an altitude of from one thousand to fifteen hundred feet. The fruit reaches its perfection in the San Bernardino Valley, where the heat in summer is sometimes oppressive and where even the winter climate is very warm. Here are grown the fancy Navel oranges, which, in the absence of the best Florida oranges, will be the finest fruit of the kind that can be procured this year. These oranges are in demand wherever they are known, and many growers are unwilling to place them in any prorating or pooling arrangement with inferior fruit. Some of the younger orange-growing localities are in better position in this respect than the older ones, because they profited by the experience of the latter in regard to the varieties which they planted, with the result that the seedling and inferior varieties were almost entirely discarded.

A second consideration was that the exchange method practically does away with f. o. b. (free on board) sales. The price is determined by the executive board in the west and by the several agents at the principal distributing points in the east. The judgment of the latter is also final as to whether a car-load of fruit ordered for any particular market shall be forwarded to that market or not. These are distinctions which might work against the growers of the finest fruit. If the theoretical plans of the exchange could be carried perfectly into practice there might be no discrimination, but it is hard to convince the grower of the best fruit that he will not suffer from coöperation with growers of fruit of a less desirable quality. Probably not more than one-fourth of the oranges sent from California this year will be strictly fancy Navels. Many growers of Navel oranges believe that they can sell them to responsible dealers and can know before the car goes forward what the price is to be, an advantage which they are naturally unwilling to abandon.

In former years the orange growers of California have suffered greatly from the dishonesty of middlemen. Sometimes no returns whatever would be made on shipments and no attention would be paid to correspondence. Sometimes the broker would pocket the proceeds, if any, and draw upon the producer for the freight. The despair and exasperation of an orange grower who has produced his fruit upon land representing an investment of a thousand dollars an acre and shipped it to market two or three thousand miles, can be imagined under such circumstances. When complaints were made and the dealer could be found, there was always the excuse that the fruit was in bad order, and, as it had long since disappeared, there was no way of verifying or disproving his statements. Such extreme instances as these have been less frequent for the past two or three years than formerly; but it has been a common thing for a dealer to reject a car, after he had ordered it by telegraph, if he found, after making the contract, that he could do better as regards quality or price. The agents of the exchange will be on the ground to look after such matters as these. They will know whether fruit reported in bad order was really so, and dealers who violate their contracts will be blacklisted, on investigation, and thus be prevented from repeating fraudulent transactions. Moreover, reputable dealers will be protected from the competition of men who do not pay for their goods or do not carry out their contracts. The exchange will guarantee the quality of all the fruit which it sells, and this fact will necessitate a similar guarantee on the part of all other shippers.

California growers confidently believe that their oranges

will take precedence as regards quality over all importations from foreign countries. The results of the present season will be watched closely and will have an important bearing upon the future of an industry which represents millions of investment.

Redlands, Calif.

Wm. M. Tisdale.

Meetings of Societies.

THE twenty-first annual meeting of the New Jersey Horticultural Society was held in the State House in Trenton last week, and it was very successful in point of attendance, in the character of the discussions, and in the display of fruits. In the course of his report, the secretary, Mr. Henry L. Budd, stated that the fruit farmers of the state, although they had much to complain of, came out ahead of their brethren, the value of the apple crop alone being greater than that of the general field crops. The great importance of frequent tillage had been made more manifest during the year than ever before. In former years fruits have been so abundant without cultivation that it had come to be an accepted truth that orchards in sod-ground are as profitable as those which receive frequent tillage, but this year experience and observation both showed that every cultivated orchard in the state yielded better where the soil was stirred as often as once a week and not allowed to become compact, so that the moisture could rise to the surface and pass into the atmosphere by evaporation. Over a large part of the state no moisture fell for ninety days, and the value of frequent surface-tillage was evident, especially in the Corn fields. Under ordinary cultivation the crop did not reach more than fifteen bushels an acre, while seventy-five bushels an acre were often reported from neighboring fields where the surface had been frequently broken, so as to become a protecting mulch. The struggle with weeds had been largely responsible for teaching this truth, as not one farmer in ten would have tilled his land but for these vigorous schoolmasters.

Where the products of market-gardens and orchards and vineyards are marketed, and where it is necessary to haul fertilizers to insure crops, the secretary named good roads as an important element in success. When it costs fifteen cents a basket to haul truck over dirt roads and three cents on macadam roads the value of a smooth road is evident. But, besides this, good roads make it possible for the farmer to get to the market when the prices are good, instead of being compelled to wait in spring or after hard rains until the mud dries.

Professor Voorhis, Director of the Experiment Station, explained the experiments going on in regard to fruit and vegetables, and announced as an important part of the work in the near future a study of methods of forcing vegetables and fruit for the early market. The station had been making some statistics of the production of the various fruits for commercial purposes, with the following result for last year: Taking the state through there were 18,749 acres devoted to Peaches, 6,104 acres devoted to Apples, 3,700 acres devoted to Pears, 64 devoted to Cherries, 27 to Quinces and Plums. Of small fruits, 3,926 acres were in Strawberries, 2,847 acres in Blackberries, 1,052 acres in Raspberries, 839 acres in Grapes, 85 acres in Currants, 20 in Gooseberries, making a total of large and small fruits 37,423 acres, to which, perhaps, ten per cent. ought to be added to cover orchards and fruit gardens not reported. The number of fruit growers in the state was 3,058, so that the average acreage of each would be twelve and a quarter acres.

Mr. J. H. Hale, of South Glastonbury, Connecticut, who has had great success in raising peaches, said that he cultivated the ground in his orchard thoroughly and pruned the trees for form until they began to bear, after which he pruned them for fruit. After they had come out in bud he trimmed them, leaving the twigs that had budded. This was a great advantage when the winter had killed part of the buds. This practice sometimes left an ugly-shaped tree, but a very valuable one. After the peaches had formed he pulled off the diseased ones, then thinned out the others until they hung four inches apart. Next year he will thin more severely, so that the fruits will be six inches apart. He fertilized heavily with potash and bone and pulled up a tree, root and branch, at the very first appearance of yellows. He took the greatest pains in picking and handling his peaches to make sure that they were in the very best condition, so that every basket was exactly what it seemed to be, the bottom layer being as good as the top. He then advertised his method and sold his fruit on the reputation for honest packing he had made. He declared that he received fifty cents a basket more by so doing and he felt better by dealing honestly with the consumers.

Mr. Charles Parry thought it was impossible to exterminate the San José scale here in the east, but that we should try to introduce the natural enemies of this insect, as had been done in California. The difficulties in fighting this pest are due to its rapid increase and the difficulty of detecting it. The treatment of the trees with a wash of caustic potash in December and of whale-oil soap in February last year left only a few scales to escape, and he thought another treatment this year would probably finish the work. The trees made a fine growth the next summer, but because of the severe cutting back necessary three or four crops would be lost. The hydrocyanic method as used in California was considered too expensive, if anything else would possibly do, especially as it had to be repeated every fourth or fifth year. He considered the introduction of such predaceous insects as feed on these scales, or of their diseases, the only safety. Some parts of California which were at one time badly infested are now practically free. Of the fifteen hundred species of ladybirds known to science as helpful, one-half eat various scale insects. They will work where a man cannot.

Professor Smith did not consider the case so discouraging. He did not believe that ladybirds could do as much for us as for the Californians, because our damper climate was inimical to them. Then, too, the ladybirds have but one brood a year, thus giving the scales a chance to gain largely on them, both before and after their time. Even in California spraying is still practiced. The action of insecticides is quite different on the Atlantic and on the Pacific sides of the continent. Kerosene emulsion is good here, but comparatively useless in California, though lime and sulphur are effective there. The predaceous insects are worth importing on trial, though fewer of them will be likely to succeed here than in California. Keiffer Pears are only infested in large orchards, though where they are near other varieties they are not liable to be attacked. A good wash can be made of fish-oil, with plenty of caustic potash, the office of the oil being to hold the potash while it eats into the scale. He never knew scales to get from one orchard to another or to isolated trees by any ordinary methods, so he considered the spread of the trouble not likely to be rapid. At Egg Harbor City Apple-trees of four or five years' bearing were infested, but they had been frequently and thoroughly sprayed with Bordeaux mixture, and the coating of lime thus given had kept the scale in check.

Mr. Charles Black, of the Fruit Committee, reported that the Crosby peach was not handsome enough in appearance for this section, but it was good to have when no other tree bears. The Elberta was all that had been claimed for it—one of the best, hardy and vigorous. Lemon Free was reported as a promising late variety. In Strawberries the Cumberland was still valuable on heavy moist soils. Pearson's Seedling, not yet introduced, produced forty crates from a quarter of an acre by the 6th of June. It is good on upland as well as lowlands. The Mary was pronounced very good in Burlington County, but other growers pronounced it a failure the first year, while the second year it was fine, although a trifle soft. Among Potatoes the Carman No. 1 was said to be the best in yield of marketable tubers.

Mr. S. D. Willard thought the Columbus Gooseberry, introduced by Ellwanger & Barry, the most promising large American Gooseberry. It makes good wood, and the fruit is large, egg-shaped, white and free from mildew. The Triumph would not make wood for Mr. Willard in New York, but Mr. Baird said it grew strong in Monmouth County.

Recent Publications.

Thoughts from the Writings of Richard Jefferies. Selected by H. S. H. Waylen. Longmans, Green & Co., New York.

This is a beautiful little book with an artistic cover enclosing some one hundred and twenty-five pages of text in heavy-faced type, red initial letters and with broad margins, and somehow the reader feels that the works of Jefferies should never be printed in any other way. No one would think of putting the robust thoughts of Thoreau in such a dress, but there is nothing robust in this anthology. Sometimes one sees a display of fierce energy, but even this seems more like the exhausting effort of delirium than the manifestation of quiet natural strength. Unfortunately, the genius of Jefferies is not displayed at its best in extracts like these, and the reader who is unfamiliar with his works will hardly get an adequate idea of his real merits. Those who know his writings will relish them because they

suggest the context and recall impressions which are left by entire essays. One closes the book with something of sadness, and, in fact, an hour with Jefferies never has the exhilaration of an outdoor walk, although no one describes what he sees more accurately, and few men ever had more of genuine poetic insight. He lacks, however, the serenity of real greatness, and, although it would be unfair to say that there is anything like querulousness in the tone of his writings, there is a certain discontent as of one who had made a failure in the battle of life and is not ready to accept the situation with patience or subordination.

Notes.

Diseases of Carnations is the subject of a bulletin which will be issued by the Indiana Experiment Station next month. As it is expensive, owing to elaborate illustrations, only a limited edition will be published, and, therefore, Carnation growers who desire to see it should send their names as soon as possible to C. S. Plumb, Director, Lafayette, Indiana.

A newspaper in Denver states that seventy-five acres of ground near that city are covered with glass for growing winter vegetables, such as Lettuce, Radishes, Onions, Spinach and Cucumbers. Car-loads of mixed vegetables, like celery, cauliflower, parsnips, etc., are sent every day to St. Louis, Kansas City and other points to the east.

Mr. Edson S. Bastin and Professor Henry Trimble begin in the January issue of *The American Journal of Pharmacy* a series of papers on the botany, histology, chemistry and economic properties of some of the important coniferous trees of North America. In the first paper, after a general account of the family, which is divided into two suborders, the Pinoideæ and the Taxaceæ, *Pinus Strobus*, of which the photograph of a branch is reproduced, is described, and the tannin contained in the leaves and bark is determined, 25.7 of tannin being found in the absolutely dried leaves, 9.37 in the dried bark of the stem, and 6.48 in the root bark.

There are a good many complaints about the careless and dishonest packing of fruits in this country, but it seems that growers beyond the sea are not altogether above criticism in this matter. In a paper on the fruit supply of Covent Garden, read before the Horticultural Club in London last month, Mr. George Monro said that he was informed by the proprietor of a large wholesale store in Manchester, where both English and American apples were on sale, that one thousand barrels of American fruit were sold against one hundred bushels of English fruit, and this was simply because the packing of the English apples could not be depended upon—there being no proper selection or grading in the English packages of fruit.

The Lemon growers of southern California think that the fertility of the soil of that state and its adaptability to the production of citrus fruits will enable them to compete with the product of southern Europe in spite of the low price of labor there and the small cost of freight from Mediterranean ports. It is not expected in Lemon-producing districts of Europe that a tree will fruit before the sixth or seventh year, and it will do well if it yields three boxes of fruit the tenth year. In California a Lemon-tree is expected to pay expenses the third year, and it should yield from five to ten boxes of fruit in the sixth year, while it is not an exceptional occurrence for trees ten years from planting to produce twenty-five or thirty boxes of fruit.

Rhubarb, forced in cellars, is already in our markets, a dozen small stalks selling for fifteen cents, and also young carrots, grown under glass on Long Island and in New Jersey. New okra is coming from Cuba, and parsley, Romain lettuce and kohlrabi from Bermuda. Last week's Bermuda steamer brought twelve crates of onions, the first of the season, which sold at \$2.00 a crate, wholesale. Chervil, delicate and fresh-looking, from hot-houses on Staten Island, is selling in considerable quantities, as also tarragon, and spring lamb has made an active demand for mint and for peas. Besides peas from Florida, a considerable supply is received from California. These are well filled out and tender, in baskets holding a half-peck, and cost seventy-five cents.

The so-called Paradise nuts, known in English markets as the Sapucaia nuts, are rather more common in our fruit stores this winter than they formerly were, and sell for fifty cents or more a pound. These nuts are closely allied to the Brazil nuts, although they are superior in flavor and more wholesome. They are about two inches long or rather more, and half as thick through, with a corky shell furrowed lengthwise, and they are the true seeds of the large, urn-shaped woody fruit

of *Lecythis Zabucajo*. This pericarp is six inches across and half an inch thick. It is very hard, and has a lid which fits tightly at the top, and which, when the fruit is quite ripe, is easily lifted off, and this gives the general name of Monkey Pot to the several trees of this genus. These trees grow in the forests of Brazil, Guiana and Venezuela, where their great trunks are seventy-five or more feet high, carrying a broad head of glossy leaves. Sapucaia nuts keep for a long time, and some of those in the market here have been held for more than a year.

The florists' windows throughout the upper part of the city are now interesting and beautiful in their attractive displays of forced flowers. In a Fifth Avenue establishment flowers of the golden-banded Lily, *Lilium auratum*, make a rich show at this unseasonable time. Sprays of *Calanthes* bearing seven to fifteen flowers are occasionally seen, and cost \$1.00, and those of *Odontoglossum crispum* command \$1.50 to \$6.00. Other Orchids now offered are varieties of *Cypripedium insigne*, *Phalænopsis Schroederiana*, *P. amabilis* and *Cattleya Trianae*. A small group of *Cattleyas* in a large window bedded with *Adiantum cuneatum* edged with *Lycopodium*, was one of the most artistic and refreshing window arrangements last week. Small plants of *Azaleas*, extremely well flowered, made a nosegay effect in their dressing of white crêpe paper, and branches of Pussy Willow seemed to deny winter in the bright glossy brown bark and silvery catkins, while *Dracænas*, grouped among Palms and other green-foliaged plants, were hardly less showy and effective than flowering plants.

According to the *Northwest Magazine*, a great fruit fair was recently held at Spokane, Washington, and although the admission fee was fixed at the nominal sum of ten cents and it was necessary to construct a great building of timber and canvas, after all expenses had been paid the net profits amounted to \$1,000, which was turned over to the treasurer of the Bureau of Immigration, under whose direction the fair was held. There were 52,000 paid admissions, the visitors coming on cheap fares from all parts of Washington, Idaho, Oregon, Montana and British Columbia. The trains carried from one thousand to three thousand people every day, and the aggregate number of strangers entertained by the city often ran up to five thousand daily. Although the exhibition was open to all products of the soil, fruits were the principal objects of display, and there were tons of fresh fruits, dried fruits and canned fruits. Seventy varieties of apples were exhibited, not to speak of other green fruits, besides a profusion of cereals, grasses, flax, broom-corn, sugar-cane, melons, tobacco, hops and native wines, so that fifty thousand feet of floor-space under roof and canvas were occupied. When we consider that the fruit industry of this region is comparatively young, both the exhibition and the interest it excited were remarkable.

To make good the shortage of oranges in the United States, caused by the loss of the Florida crop, many remote countries are being drawn upon. Jamaica, Mexico, north and south California, Spain and Sicily have each contributed to our markets, and cases of oranges from the Holy Land have recently been put on sale in Chicago. This fruit is said to be light-colored, oval, carefully packed and in excellent condition. It was grown in the district between Jerusalem and Jaffa and sold for \$4.00 a case. Only meagre reports of the effects of the freezing weather in California on the last days of the year have gone out from that state. Conservative business men here who have much to lose by the failure of the California orange crop, and every reason to wish for heavy shipments of choice fruit, estimate that as much as eighty per cent. of the oranges in the Riverside district are frozen on the trees, while Redlands, Arlington Heights and other elevated sections suffered little injury. The intense cold continued during the nights of December 29th and 30th, the anniversary of the fatal freeze in Florida the year before. The thermometer is said to have registered as low as seventeen degrees, Fahrenheit, at Riverside, and since the trees were killed in Florida at fifteen degrees, the groves themselves may have suffered, and this would be a more serious matter than the loss of a single crop. Hardly ten per cent. of the crop had been marketed, prices for Navels here being \$4.25 to \$4.50 a box at wholesale. Some oranges frozen in transit during the same period of severe weather have brought but \$1.60 to \$1.80 here, and the depression of prices will continue for fruit now on the way and suspected of having suffered on the trees. In the event of serious injury in California the Mediterranean supply must now be the main dependence, and the quantity of oranges and lemons imported from Italy, Sicily and Spain last season, 2,222,044 boxes, is likely to be greatly increased.

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Horticultural Education.

IN a recent number of this journal it was held that the study of horticulture and agriculture in their scientific aspects has a distinct value as a factor in furnishing exercise for certain powers of the mind. Every one admits that the natural sciences should have a place in the curriculum of colleges and schools as elements of wholesome intellectual development, if for no other reason; and, perhaps, no science furnishes better mental training and exercise than agriculture and horticulture when their principles are systematically studied. This does not imply that there should be no such a thing as direct technical training in horticulture and agriculture as arts, but the fact should be emphasized that the mental exercise and discipline furnished by horticultural education in its broad sense is equal, and perhaps superior, to that furnished by the study of any other science. No kind of mental application will be more effectual in forming habits of careful observation and comparison and in securing those orderly methods of thinking which are of the greatest use in the examination of many of the problems which confront us in our daily life.

In an article in a recent number of *Science* on Horticulture at Cornell, we are glad to see that this view is set forth with considerable fullness by Professor Bailey, who contends that horticulture as studied at that university is capable of adding much to the value of a course of liberal academic training. Professor Bailey illustrates the merits of horticulture as a science by showing some of its uses and applications in discussing the theory of evolution, which is perhaps now the most important conception with which the thinking world has to deal. In supporting the hypothesis of evolution, horticulture shows the development of life in actual operation. More than six thousand species of plants are cultivated, and most of these have been broken up into varied forms by the touch of man. Some species have produced thousands of distinct forms, and the methods of the production of many of them are on record. In place of arguments as to the probable influence of climate upon plants the horticulturist cites definite cases, so that there is no conjecture about the matter. Instead of speculating upon the transmission of acquired characters the horticulturist furnishes proofs of such transmission. Palæontology brings disjointed evidence in regard to the

influence of selection and probable changes from environment, while the horticulturist brings examples before our eyes to prove that he can modify and mould vegetation at his will. The horticulturist creates new species and shows you numbers of cultivated plants of which no one knows the original form, because the ones with which we are acquainted are so unlike the type that the two can never be connected. This is only a single line of inquiry, and other illustrations quite as striking can be given to show that there is an abundant field for scientific research and profound thought in horticultural science as such.

The value of agricultural colleges as training schools for those whose purpose it is to practice agriculture and horticulture is conceded, and there is no question that they have been very helpful in making expert farmers and gardeners, in increasing the products and profits of cultivation and in improving the conditions of rural life. But, aside from the strictly educational value of the broader way of studying the science of crops, it must be remembered that this scheme of instruction has also its immediate practical value. The student who masters principles is more thoroughly equipped than one who only learns rules. Of course, it requires a somewhat mature mind to grasp the scientific laws on which the practice of horticulture is based, but when once this is accomplished the student can make his own applications, and he is not only less liable to make mistakes than one who is generally ignorant of the principles upon which his practice is founded, but he will constantly be stimulated to use his mind rather than his hands, and to get that enthusiasm for rural life which is essential to the highest success. Horticultural and agricultural education, as distinct from mere training, is not always possible, but where the course covers several years this broader method is certainly preferable, and this not only because it insures better practice in the rural arts, but because, as a part of a general education, it makes more capable and self-reliant men and women.

In reference to the methods at Cornell, Professor Bailey says:

The teaching there aims not so much to make farmers as to educate farmers' sons and daughters. Its fundamental idea is to give those students who anticipate a rural life such a breadth of training as will put them in touch and sympathy with the traditions of education, with all the larger movements of the day, and enable them at the same time to understand the fundamental reasons of their own occupation. There is less attempt to apply this teaching upon the university farm than there is to instill the desire to master the underlying principles of horticulture. Teaching is done by class exercises and by laboratory work, as it is in other scientific and technical subjects at the present day. If the student hears a lecture on the rotation of crops he goes for a walk with the professor over the fields of the farm and the adjoining lands and there observes the good and bad points of farm management. If he hears a lecture upon Winter Tomatoes he also goes with the instructor or alone, or from day to day, and studies the Tomatoes as they grow under glass. Besides this, he has his mind opened by thinking upon economics, language, history and general science as much as upon some of the particular subjects with which he is to deal in a more intimate way. The student should be a citizen before he is a farmer.

Our great progress in the mechanic arts is due to the application of science to the various branches of manufacture in cheapening processes, making them more effectual and utilizing by-products. The arts of agriculture and horticulture have the same need of science, and advancement in either of them must be in the same direction. Unlike manufacturing industries, however, which are mainly carried on by large forces of men under a single directing head, the work of agriculture is scattered over thousands of farms. The number of men superintending these operations—that is, of men who must rely upon their own knowledge—are in much larger proportion to the mere laborers than are the skilled superintendents in the field of manufactures. For this reason there is no class of persons, taken as a whole, who stand in greater need of such an education as will enable them to conduct their work with

intelligence. The experiment stations are doing much for cultivators of the soil by publishing the results of scientific research and making experiments which are too costly for farmers to carry out. But the hope of agriculture in the future in this country must rest, after all, on a wider system of education. The rural industries will prosper just as the whole rural population becomes more enlightened and are enabled to bring to their daily work minds drilled and equipped for active thinking as well as muscles trained and strengthened for expert handiwork.

THE latest and forty-eighth volume of *The Garden* is dedicated to George Nicholson, curator of the Royal Gardens at Kew, for his work among trees and shrubs. In his dedication the editor takes occasion to state that "we do but express the general feeling of the horticultural world toward the important national establishment of which Mr. Nicholson is the distinguished practical head. We recognize with considerable pleasure the great improvement in the present cultivation and disposition of the collections at Kew compared with past times, an improvement due to the proper recognition of the general desire to see picturesque and artistic gardening in the nation's own garden as well as the purely botanical. We believe this has been accomplished without any loss on the botanical side; indeed, we learn that the collections are now much richer in species, as well as in botanical interest, than ever they were. Every gardener is grateful for this improvement at Kew which we owe to the present staff of which Mr. Nicholson is a distinguished member, having been appointed curator at the same time as Mr. T. Thiselton Dyer was appointed director on the retirement of Sir Joseph Hooker in 1886." In this country Mr. Nicholson is well known as editor of the useful *Dictionary of Gardening*. In 1893 he visited the United States as a judge in the Horticultural Department of the Chicago Exposition and made many friends here.

Early Experiments in Crossing Plants.

IN the reference to Thomas Andrew Knight and his work in *GARDEN AND FOREST* of December 25th, p. 512, a statement is made from which a wrong conclusion may be drawn. Professor Bailey is reported as saying: "He was the first man, so far as I know, who advised the use of cross-fertilization for the purpose of producing new varieties and for the purpose of improving existing ones. A similar work was taken up by Darwin." The emphasis may be on Knight's important work in experimenting with varieties which already existed rather than in the production of new varieties by the crossing of species. But the coupling of the name with that of Darwin seems to refer to cross-fertilization in general, for Darwin experimented both with species and varieties. Possibly a distinction is made between a hybrid, between different species and a cross between different varieties, but this is scarcely valid on the scientific side. Nägeli has said of it: "This distinction may sometimes serve a practical purpose, but is frequently confusing and deceptive, for it supposes a difference that is merely one of degree."* However this may be, Köhlreuter, an earlier experimenter than Knight, also used varieties as well as species in his extended investigations on cross-fertilization, and so anticipated Knight in this respect also. His object differed from Knight's, for it was to prove the sexual nature of plants, a question about which botanists were still contending. Like Darwin's experiments in cross-fertilizing plants to prove his theory of the origin of species, Köhlreuter's work was almost purely scientific in its aim, but he was a pioneer in what has proved of immense practical benefit. Some account of his earliest work, and that of Linnæus, along similar lines, may be of interest.

Köhlreuter was a Swabian, born at Sulz, on the Neckar, where he produced his first hybrid plant in 1760. In 1764

he was made Professor of Natural History in Carlsruhe, a chair which he held till his death in 1806. Detailed accounts of his earliest work were published at Leipsic at different times from 1761 to 1766.† The results of subsequent experiments appeared in the *Transactions of the Imperial Academy of Sciences of St. Petersburg*. Like the work of Conrad Sprengel on the agency of insects in fertilizing flowers—in which he was anticipated by Köhlreuter—published in 1793, his experiments for a time passed out of sight or attracted but slight attention. The revived interest in the subject from the labors of Knight and Herbert in England, Gaertner and Wiegman in Germany, Godron in France, not to mention others, called attention to them once more. Knight's efforts to improve fruits and vegetables, which began about 1787, were evidently made in ignorance of what Köhlreuter had done, and his discoveries were to that extent independent. So scholarly a man as the Rev. William Herbert, who did much splendid work in crossing plants, says that he began his investigations "ignorant of the experiments of Köhlreuter." He gave the first account of his investigations before the Horticultural Society of London in 1819.‡ Köhlreuter's work, being purely scientific in its character, did not enlist the coöperation of horticulturists like the later work of Knight and Herbert, which had, or was soon given, a practical bearing. Botanists, being mostly devoted to systematic botany, were indifferent or even opposed to such labors. This attitude of botanists and failure of horticulturists to see the bearings of such experiments on their art, may to some extent explain the temporary oblivion into which Köhlreuter's earlier work passed.

His first success was in crossing *Nicotiana paniculata* and *N. rustica*. From the seed produced other plants were raised. Various other experiments followed, sometimes with varieties of one species, more frequently by crossing different species. Though some of the conclusions he derived from his experiments have proved erroneous, partly because he mixed up certain a priori ideas with them, to him is largely due the credit of placing the theory of the sexuality of plants on a firm foundation. Little ground for doubt was left after his careful experimentation, conducted on the strictest scientific lines, and the sex of plants became a fact without dispute, though it had been broached as far back as the time of Aristotle. Köhlreuter claimed that this *Nicotiana* cross was the first one artificially produced to which absolute credit could be given. There was a bare possibility of their spontaneous production among plants in a wild state, but the antecedent probabilities were against it.

Prepossessions, based partly on such ideas, partly on the great infertility of hybrids and their tendency to revert to one of the parent species, especially when left under conditions to be fertilized by their pollen, hardly left Köhlreuter in a state of mind to do full justice to Linnæus, who was also investigating this subject. The great Swedish naturalist had a lively imagination and drew too much upon it, but every case of the crossing of plants he and his pupils discovered or artificially made cannot be disproved as easily as Köhlreuter and others have thought they might be, so he sets aside the claim of Linnæus to the production of a hybrid Goat's-beard in 1759, calling it but a half hybrid at the most.

In 1757 Linnæus found a *Tragopogon* in his garden, which he named *T. hybridus*. It sprang up in a bed where he had planted *T. pratensis* and *T. parvifolius*. Winter came on before the seed matured, and he was not able to test its power of reproduction. The next year he fertilized the plants artificially. He removed the pollen of *T. pratensis* by rubbing it off early in the morning, and a little later in the day brought pollen from *T. parvifolius* to

† Dr. Joseph Gottlieb Köhlreuter's *Vorläufige Nachricht von einigen das Geschlecht der Pflanzen betreffenden Versuchen und Beobachtungen*. (Reissued by Engelmann.) Leipzig, 1893.

‡ All the references in Herbert's book on the *Amaryllidaceæ* and its supplement (London, 1837) are to the acts of the St. Petersburg Academy, unless a doubtful allusion to "one concerning *Nicotiana*" is to those begun in 1761.

* *Botanische Mittheilungen*, vol. II., p. 188 (note), in an essay on "Die Bastardbildung im Pflanzenreiche."

its stigmas. The heads were marked by a thread. Seeds were formed, which being sown germinated in the autumn and in the following year bore flowers, which were purple, with a yellow base. These also bore seed that matured. An account of the plant was given by Linnæus in a prize essay on the six plants sent to the Academy of Sciences of St. Petersburg in 1760.* It is mentioned in a later paper read at Upsala in 1762 by one of his pupils as being annually propagated by seed.† Focke, who has given us a convenient summary of what is known of hybrid plants, both spontaneous and artificially produced, calls this plant of Linnæus "the first hybrid intentionally produced for scientific purposes," and adds that the objections which have been brought against its hybrid character by Köhlreuter and others "are not sound, since they deal with plants of the second generation."‡ The seeds of the hybrid seem to have reverted to *T. pratensis*, which was one of the grounds of Köhlreuter's objections, and of his disbelief in the spontaneous production of crosses when the plants were left free to be pollenized by their parents. A spontaneous cross between these species has, however, been reported from the Danish islands of Laaland and Fünen, "the outer flowers brown-violet, the inner yellow."

A limitation is made in the above cases to crosses produced artificially for scientific purposes, for it can scarcely be disputed that Thomas Fairchild, the nurseryman and florist, of Hoxam, near London, had before 1719 artificially crossed *Dianthus caryophyllus* and *D. barbatus*. This has since been cultivated under the names of Fairchild's Sweet William, The Mule and *D. hybridus* hort. The authority given for this is Richard Bradley, an English writer on horticulture and husbandry of the first half of the last century. Hence the credit for the earliest authenticated cross intentionally made is due to a man engaged in the practical work of gardening.

Chicago, Ill.

E. J. Hill.

The Box-Elder on the Plains.

I HAVE been interested in studying the problem of the distribution of native trees upon the Great Plains and their adaptation to the peculiar conditions which prevail over this great central region of the continent, and no tree has attracted my attention in this region more than the common Box-Elder, or Ash-leaved Maple, *Acer Negundo*. As it grows upon the Plains it is a stocky tree with a trunk ten or twelve inches in diameter and not more than six or eight feet in length, bearing a rounded bushy top, giving to the tree, as a whole, much of the appearance of a well-grown Apple-tree in an eastern orchard. It occurs along the streams in Nebraska from the Missouri River to the Rocky Mountains, and here and there in favored localities it has pushed away from the streams a mile or so. It appears to be perfectly hardy, and I am sure that I have never seen the slightest indication of injury from the greatest exposure to severe cold.

The Box-Elder has been used very freely by the settlers who took up "tree claims," and for many years, until the repeal of the timber-claim law, there were millions of these trees planted every year in the state of Nebraska alone. The young trees transplant easily and are readily handled, the per cent. of loss usually being very low. Then, again, it is a very simple matter to grow the trees from the seeds, which insures the low price of the young trees. A few years ago I visited a large establishment in southern Nebraska where from eight to ten millions of young Box-Elder trees were grown each year. The winged fruits were collected in the autumn and carefully protected in a great barn, and in the spring these were sown in drills, just as a farmer sows any of his crops. In a short time the little plants pushed through the soil and began to shoot upward. The fields of Box-Elder seedlings were cultivated from time to time, and when a few inches

high properly thinned to prevent overcrowding. The crop of trees required little more care than a crop of Corn, and not as much as a crop of Onions or Sugar Beets. Late in the autumn they were taken up by the aid of a special plow, gathered into bundles and stored away in damp, cool cellars, ready to be sent out in early spring. Few trees are as easily propagated and handled. In fact, one could very easily cover hundreds of acres with this tree by simply planting the seeds and caring for the young trees a few years.

The wood is light and easily cut and split, and makes good fuel. The tree might very profitably be grown for supplying fuel, its rapid growth giving it a special fitness for this purpose. Something, too, might be said for it as an ornamental tree. Its rather regular top and light green foliage, which is usually free from insects, make it desirable for the grounds near the house.

University of Nebraska.

Charles E. Bessey.

What is the Forest Policy of European Nations?

WHENEVER we are about to advocate or inaugurate a new national policy it is wise to see what other nations are doing or have done in the same direction, even though we may not see proper to imitate them.

In regard to its public lands, the policy in the United States has been for the Government to get rid of them as quickly as possible, until in 1891 a new policy was feebly inaugurated with reference to forest-lands by giving the President power to set aside and reserve such areas as he saw fit. This policy has, however, not as yet been safely established, and arguments for upholding it and for securing further application are still in order.

In Europe the tendency at the end of last and beginning of this century had also been to divest the Government of this kind of property under the misapplication of the theories of Adam Smith and the doctrine of individual rights, urged to its most extreme consequences. France, during and after the Revolution, took the lead in this dismemberment of its forest property, selling during the years from 1791 to 1795 nearly one-half of its state forests and continuing to reduce the area until there remained in 1874 but one-fifth of the original holdings of the state. Many of the German principalities followed the same policy, selling off the forest-lands which had been preserved in the Government for centuries.

But during the last fifty years or so of this century a reaction set in; the fearful consequences of unrestricted exercise of individual ownership over this class of property had made it plain enough that the necessity of a change arising from communal interests had come, and now it can be stated that the policy is entirely reversed, that all European nations have the tendency, not only to hold their forest property in Government hands, but to extend it in area and in efficiency, and also to exercise stricter control over the use of private forest property wherever damage to communal interests might result thereby.

Instead of selling, most Governments now buy. There is, to be sure, also selling of Government forest property, but only for the purpose of making the Government forest property more efficient, of consolidating it and of making it serve to the best advantage the purposes of protection to agricultural interests. Thus, in Prussia, agricultural land under forest is exchanged or sold for non-agricultural land or devastated forest property, and servitudes resting on the state forest property from olden times are sometimes removed by cession of forest-lands, so that the bare statistics of the increase in the area of state forests do not tell the whole story.

In France, since 1870, no sales have been made, and by gradual acquisitions a small and steady increase of forest-land has taken place. The difference between the areas in 1872 and 1892 was over 300,000 acres, the state holdings representing now about ten per cent. of the total forest area, and in addition the state has spent in the neighborhood of

* *Amenitates Academicæ*, Glibert ed., 1787-88, vol. 1., p. 212.

† *Ibid.*, p. 182.

‡ *Pflanzen Michlingæ*, pp. 221, 430.

\$40,000,000 toward reforesting dunes and devastated mountain-sides, and in the budget for last year for its Forestry Department nearly \$1,000,000 of the \$2,500,000 appropriated for the department is set aside for such extension of forest area and improvement of the existing one. In addition, the private property is controlled entirely as regards clearing; that is to say, no clearing may be done without the sanction of the Government authorities.

In Prussia, which represents about two-thirds of Germany, the policy of selling also prevailed in the beginning of the century, but since 1831 a constant increase has taken place, the increase in the old provinces from 1831 to 1892 being but a small fraction, but in the entire monarchy from 1870 to 1892 it amounted to 280,000 acres. Here, especially, the apparent small increase is due to the fact that much land was exchanged or given to get rid of servitudes, obligations which were a charge on the forest property. For this purpose 125,000 acres were ceded, besides the payment of fully \$20,000,000 in money, all of which represents an increase in the efficiency of the remaining forest property. Altogether, between the years 1867 and 1895, over 22,000,000 marks were spent in increasing the forest area, and the budget for 1895-96 contains an item of 2,000,000 marks for the purpose of acquisition. In addition it is of interest to note that during the last twenty-five years the conservative management has resulted in increasing the stock of wood in the state forests by over 25 per cent., in spite of the fact that the annual cut has increased by 40 per cent., while the receipts have increased by 50 per cent., although the expenditures, and especially the salaries of the forest officials, have been increased during the same time. The net income was of the gross receipts—in 1830, 61 per cent.; in 1870, 52 per cent., and in 1893, 47 per cent. The control of private forest property in Prussia is, perhaps, least developed in the German states, the necessity for such control being probably less on account of the situation of the larger part in the plains country, and also because the large holdings of the great proprietors were less liable to dismemberment or mismanagement. The belongings of the communities, however, are under the same control as in France, and legislation looking toward greater control of private property wherever communal interests are involved is in preparation.

In other German states we may note an increase of 4 per cent. in the state forest area for Bavaria between the years 1873 and 1890—an increase of over 3 per cent., by purchase, for the state forests of Württemberg, the one state in Germany where clearing is also absolutely controlled by the state authority. A small increase is notable in Baden and Saxony, so that we see Germany, as a whole, is increasing its state forest property.

In Austria the selling craze lasted until about 1872, and now the state is the only great purchaser, buying, besides minor lots, in 1886, 60,000 acres; in 1888, over 230,000 acres, and in 1891, 210,000 acres in single purchases.

Italy, to be sure, has been too poor to enlarge its state property, but the laws of 1877 and 1890, which provide for reforestation of denuded mountain lands with financial assistance to the communities from the Government exchequer, exhibit the conservative tendency of the Government and its recognition of the fact that a strong communal interest attaches to this kind of property.

Even Russia, though probably the least-developed of the European countries, and largely in the pioneering stage, holds on to its Government possessions, provides for their rational administration and extends the same where this is desirable. In the extreme north, where more than one-half of the country is still covered with woody growth, no forest policy, probably, is carried out. In the central states and Baltic provinces, representing one-quarter of the total area, where the percentage of forest land sinks below 30 down to 17 per cent., a conservative forest management of the Government forests after the pattern of Prussia is established; and in the prairie country on the southern third of the empire large amounts of money are

spent by the Government in planting forests or assisting private owners to do the same. Russia, therefore, does not sell any of its real timber-lands, excepting where communities do not own their timber, and, therefore, the state property is liable to depredations, when the Government tries to obviate the difficulty by making the community owner. In addition a very elaborate law exists for the purpose of preventing mismanagement, which places the approval of working plans, of making clearings, etc., in the hands of a specially constituted committee for each department, and the Government itself must secure the approval of this democratic committee for its operations.

Finally, while England has not any forest area worth speaking of, for India, at least, the same policy of conservation and of increasing Government control is notable. Her Indian forest policy was inaugurated about 1873. From 1882 to 1892 the reserve forests were increased from 46,213 to 59,743 square miles, and the total forest area under the control of the Government from 71,972 to 114,966 square miles. Strong efforts are being made to place the entire forest under the direct control of the Government.

We see, then, that these nations, having learned from sad experience, reversed in time their policy and act upon their knowledge that forest property is best preserved in the strong hands of Government, which is permanent, as the forest cover in the mountain must be to secure favorable agricultural conditions. Must the United States learn also from her own experience, or can the lesson be learned from the experience of others?

Forestry Division, Washington, D. C.

B. E. Fernow.

Plant Notes.

Stuartia Pseudo-Camellia.

THE genus *Stuartia*, a member of the Tea or *Camellia* family, named in honor of John Stuart, Marquis of Bute, is distinguished by its deciduous membranaceous oblong-ovate serrulate leaves, large solitary axillary flowers with five or six sepals and five or six obovate crenulate white petals, and by its five-celled pods with one or two seeds in each cell. The genus is confined to eastern Asia, and to eastern America, where there are two shrubby species; one of these, *Stuartia Virginica*, grows only in the coast region of the southern states and bears the largest and most beautiful flowers of any member of the genus which is now known; the other, *Stuartia pentagyna*, is common on the lower slopes of the southern Appalachian Mountains, where it sometimes grows in great profusion, especially in eastern Tennessee. In Japan and China there are two or three species of *Stuartia*. Only one of these, however, *Stuartia Pseudo-Camellia*, is a common plant in Japan; the others are either confined to the southern islands or are extremely rare, and neither of them is found in our gardens. Little is known of *Stuartia* in China beyond the fact that one of the species of southern Japan extends to the mainland, where it is not improbable that other members of the genus will be found.

Stuartia Pseudo-Camellia (see illustration on page 35) is a tree upward of fifty feet in height, with a trunk sometimes two feet in diameter, and in the mountain forests of central Japan, where it is abundant, is always a conspicuous object, owing to the smooth, bright red bark, which peels off in great thin flakes like that of the Crape Myrtle (*Lagerstrœmia*), and gives the tree its name of *Saru-suberi*, or Monkey Slider. The handsome dark green leaves, which insects do not mutilate yet in our gardens, and the large delicate flowers, whose beauty is heightened by the contrast between the purple stamens and the white petals, need no special description, for, in general appearance, they resemble those of our native species.

Thirty years ago *Stuartia Pseudo-Camellia* was sent to the United States by the late Thomas Hogg. It was propagated with other Japanese plants in the Parsons' Nursery, at Flushing, Long Island, and flowered several times in the neighborhood of this city some years before its flowers

unfolded in Europe, where it is now rightly considered one of the most attractive garden shrubs.

In Japan *Stuartia Pseudo-Camellia* grows freely up to elevations of three thousand feet above the level of the sea, and in the United States is perfectly hardy as far north as

but once established they go on improving for many years, and are among the most beautiful and desirable of shrubs.

PYRUS CORONARIA.—Few small trees are more desirable than the Crab-apples from Japan and Siberia, which we



Fig. 4.—*Stuartia Pseudo-Camellia*.—See page 34.

eastern Massachusetts, the specimen from which our illustration is made having been produced in the Arnold Arboretum. *Stuartias* can be raised from seed and by layers, which, however, take some time to produce roots. They require deep rich soil, delighting in a compost of peat and loam; they grow slowly and do not begin to flower early,

have often commended in these columns. But our native Fragrant Crab, as it is sometimes called, ought not to be neglected, especially when parks or large grounds are to be planted. The beauty of this tree was appreciated by the early settlers in this country, and the Swedish traveler, Kalm, notes that in Pennsylvania and New Jersey single

trees of this species were even then often planted near farm-houses on account of "the fine smells which their flowers afford." It has been a favorite garden tree in Europe for more than a century, and our European correspondents have commended it as having few rivals among ornamental Pears and Apples, although of late years it seems to have been somewhat neglected. When at its best in the lower Ohio valley and in the states west of the Mississippi River it is a bushy tree sometimes thirty feet high, with a trunk more than a foot through, breaking into stout spreading branches eight or ten feet above the ground. Usually it grows smaller, and sometimes is little more than a shrub with stiff contorted branches. Its small size and attractive habit give it a value for wood borders, shrubberies and even for small gardens. Its pale pink or rose-colored flowers appear ten or twelve days after the petals have fallen from other Apples. They are nearly two inches across when fully expanded and have a delightful odor. The waxy, translucent fruits, which are from an inch to an inch and a half in diameter, hang gracefully on long stems and remain on the branches until after the leaves have dropped in autumn, when their greenish orange color, flushed with scarlet as they ripen, and their delicious fragrance make the tree quite as ornamental as it is in June.

BEGONIA EVANSIANA.—This plant, often called *Begonia discolor*, is a native of China and Japan. It is much the hardiest of all the *Begonias* so far as known, and we have often commended it for this quality as well as for its beauty. The plants, of course, die down root and branch every year with the first frost, but the bulblets, which form plentifully at the bases of the leaf and flower-stems, will have fallen to the ground; these sprout just as soon as warm weather commences the next year, and soon develop into blooming plants. Mr. Oliver writes that this *Begonia* has become naturalized in the Botanic Garden at Washington, not in one place only, but in several, for over thirty years. It seems to like positions for hibernating which are not affected in the least by sunshine. On the north side of a house, close to the wall, it comes up abundantly every year—in fact, far too abundantly, for many of the plants have to be pulled up to give the remainder a chance to develop. The bulblets do not receive any protection whatever in the way of mulching; they are invariably left to take care of themselves. The rock-garden is another spot where this *Begonia* is at home; those bulblets which fall on the shady side of the rocks survive the winter with ease, while those which are exposed to the sun, owing, perhaps, to successive freezings and thawings, are killed. After the plants are up a certain height a little decayed manure thrown over the roots accelerates the growth of the plants and produces a heavy crop of flowers. Some interesting experiments have been made at the Washington Gardens with this plant, where new colonies have been started with bulblets from plants growing out-of-doors, and also from those which have been grown for years in a hot-house. While it is an easy matter to start a new colony in a suitable place with plants or bulblets grown outside, it is difficult to get a plant from indoors to perpetuate itself in the open air. The plants from the hothouse form bulblets enough, but in winter they require protecting by dry leaves or some similar covering for a season or two.

Cultural Department.

Winter Work among Insects Injurious to Fruits.

MR. M. V. SLINGERLAND, of Cornell University, makes some timely observations on this subject in the current number of *The American Agriculturist*, the principal points of which are here reproduced:

The burning of fallen leaves and other rubbish in or near fruit plantations of any kind will prevent many insect pests from obtaining winter shelter near their food-plants, and those pests already in hibernation will be killed. Many of our worst

insect pests, as the plum curculio, thus hibernate in rubbish. It is a good practice to scrape off the rough bark from the trunks and larger branches of fruit-trees, for many caterpillars of the codling moth (then in their little cocoons of silk), the hibernating adults of the pear psylla, and the hibernating eggs under the scales of the oyster-shell bark-louse and the scurfy bark-louse will be dislodged or killed. A coating of white-wash or some similar wash will tend to keep the bark clean, thus rendering it less attractive as a hibernating place for insects.

If fruit-trees are pruned at any time during their dormant period, the prunings should always be burned. These prunings will often bear the wintering eggs of the different kinds of plant-lice (as the apple and cherry aphides and the hop aphids, whose eggs are laid on Plum-trees) that appear in such great numbers on the trees in the spring and summer. The half-grown caterpillars of the cigar-case-bearer are also then snugly tucked away in their little curved cases attached to the bark of the twigs, and many would thus perish on the prunings. This insect has recently come to be a serious Apple pest in western New York.

Trees infested with the oyster-shell bark-louse, the scurfy bark-louse, the San José scale or any other scale insect should be thoroughly washed with whale-oil soap in a solution of one or two pounds to a gallon of water. It should be remembered that the wash must come in contact with the insects to kill them. With this wash, or with a strong kerosene emulsion, many of the adults of that dreaded pest, the pear psylla, then in hibernation in sheltered places on the bark, can be killed.

The New York Plum-scale, which has recently caused great destruction in western New York Plum orchards, can be fought to the best advantage only when the trees are dormant, as the scales are then young and tender and lie exposed on the bark. Badly infested trees should receive a thorough spraying with kerosene emulsion (Hubbard-Riley formula diluted four times) in the fall, in the winter if possible, and another very thorough application early in the spring before the buds swell.

The eggs of several insect pests can be collected and destroyed during the winter, thus greatly reducing the numbers of the pest the next season. The eggs of the Apple-tree tent caterpillar are glued together in a large, conspicuous mass, which usually encircles a twig; it is a short job to look over a tree and remove these egg masses. The eggs of the white-marked tussock-moth form a very conspicuous large, white, froth-like mass on the bark of the trees, or on near-by fences or buildings; this is the insect that is ravaging the shade-trees in several of our large cities. It was nearly exterminated in Rochester by offering prizes to the school children for collecting the eggs; the children collected millions of the frothy egg masses. The eggs of the four-lined leaf-bug, a serious Currant pest in some localities, are laid in slits cut in the shoots near the tips; the white ends of the eggs project out of the slit, and one can thus quite readily determine the infested tips and cut them off. The long ragged scars or slits often found in Raspberry-canes, or in the twigs of fruit-trees, are the work of the snowy tree-cricket, done in laying its eggs; this is the only damage done by the insect. The infested canes or branches are readily seen, and should be removed. When the eggs of any of these insects have been collected, they should always be burned. If left on the ground they will hatch as readily there as on the tree or bush, and the young will easily find their way to their food.

Currant-bushes and Raspberry-canes are often infested with borers; two kinds, a beetle and a moth, work in currants. Usually the infested shoots can be quickly detected in the spring when growth begins, and all such should be removed and burned at once, thus destroying the developing insect life they contain. The hydrocyanic acid gas treatment, so extensively used in California, will probably never come into general use among New York fruit growers. It is too expensive, and most of our insect pests can be effectively combated by other means with less labor and expense. There is scarcely any question about its efficiency against all insect life, especially scale insects; we have been unable to find a living San José scale on trees treated with the gas. It is the most efficient and practicable method for our nurserymen to use in fumigating their stock to prevent the distribution of the San José scale, the pear psylla, the bud-moth and other serious pests. There is no longer any doubt that some New York nurserymen are sending out these insects on their stock; and the time may soon come when they will be compelled to resort to fumigation with the gas to protect their trade, and the matter is worthy the careful attention of nurserymen throughout the country.

Cultivation of the Tomato.

THE Tomato is an annual, a native of tropical America, and under normal conditions completes its cycle of life in from one hundred and fifty to two hundred days. For the first ninety to one hundred and twenty days the plant gains at a constantly increasing rate in size and vigor, acquiring a sort of momentum of growth, and then commences to mature its fruit, expending more and more of its strength in this way until the plant becomes exhausted and dies. The preliminary accumulation of vital energy is essential to perfect fruitfulness, and if it is not established or is lost through a check in growth the plant will endeavor to develop it by extending the growing period into that in which under normal conditions its undivided energy would be expended in the production of fruit. A temperature of about seventy degrees in full sunlight is essential to the best development of the plant during the growing period, and one ten degrees higher is most favorable for the maturing of the fruit, and the plant will not thrive if either the air or soil is much colder. As in its native home favorable conditions of heat and moisture are during the growing season very constant, we are not surprised to find that the plant has little ability to endure unfavorable conditions. In a temperature of forty-five degrees or less, either of the soil or air, the plant not only will not grow, but will lose vigor and vital energy, the injury being proportioned to the duration rather than the degree of cold, although a freezing temperature for an hour will kill it.

In the latitude of Detroit the average temperature at noon is not as high as seventy degrees until about June 1st, and it is only during August and September that the average noon temperature reaches eighty degrees. It is thus evident that in order to secure a perfect development of the Tomato in this latitude we must extend the season artificially, and the only practical way to do this is to start the young plants under glass. If we sow the seed about April 10th, supply the necessary conditions of light, air and heat to secure a natural, healthy and vigorous growth, the seedlings will be as large as it is practicable to transplant by June 1st, which is as early as favorable conditions of soil and air can be expected, and if we then set out the plants without seriously checking their growth they will reach their full size and acquire the vital energy necessary to the production of a maximum crop of fruit by July 20th or August 1st—as soon, that is, as favorable weather for the ripening of the fruit can be expected. The common practice is to plant the seed much earlier, often as early as March 1st; this gives ninety days before the conditions are such as to make it safe to set the plants in the open ground, and if the plants grow naturally they would reach their full size and be far too large for transplanting without most serious check. On the other hand, to grow the plants so slowly that at the end of ninety days they are still of a size suitable for transplanting, is to fail to develop any of that momentum of growth which is essential to perfect fruitfulness. Such plants can never in our climate give a maximum crop of fruit, though they may reach full size.

It seems, then, that a careful consideration of the character of the plant and the climatic conditions we have to meet will lead to the adoption of the following as the best method of adjusting them: Sow the seed between April 1st and 10th in boxes of light, loose soil, kept at a temperature of about sixty degrees and moderately moist. As soon as the plants have started true leaves, transplant into small pots or other boxes; if in boxes, they should contain three to five inches in depth of light rich soil, and the plants should be set four inches apart each way. If pots are used, the plants should be repotted into larger ones often enough to prevent their becoming pot-bound. A day temperature of sixty to seventy-five degrees should be maintained, with the soil and air moderately but constantly moist. Above all, an abundance of light and air must be provided, a necessity which makes a special hotbed, or a well-protected cold-frame where the soil has been well warmed up, a better place to grow plants than a greenhouse. In the mean time the ground where the plants are to be set should be thoroughly prepared by first a deep cultivation, then an evenly spread dressing of well-rotted manure, which should be well worked in. Plowing or spading and cultivating should follow, and after an interval of a few days another cultivation as deep as possible, and the land should again be cultivated just before setting the plants. The purpose of this is to form a deep bed of well-warmed and friable soil in which the finely divided fertilizer shall be well mixed, and which will retain as much as possible of the spring rains. This thorough preparation of the soil is the prime secret of successful Tomato culture, and it is much cheaper and better to do the necessary deep cultivation before the plants are set. In this latitude the

danger of cold storms is rarely over, and the soil is rarely warm enough to warrant the setting of plants before June 1st, and where the ground is well prepared and the plants well grown there is no advantage in putting them out till the conditions are favorable for rapid growth.

Give the plants but little water, barely enough to prevent wilting, for four or five days before, and a liberal watering two or three hours before setting. In putting out the plants be careful to save as many of the roots as possible and to get them into the ground in a natural position without being kinked or crowded together, and, if it is practicable to do so, soak the ground about the plant after setting, but if this is done care should be taken to draw some dry earth over the wet soil, so as to prevent its baking and cracking. A few days after the plants are set stir the surface soil with a hoe or rake, and repeat this every few days as long as the size of the plants will permit. If the preparation of the ground has been thorough there will be no need of deeper cultivation, which would do more harm than good. If a smaller quantity of extra-fine fruit is preferred to a larger yield of that which is simply good, it will be better to stake or trellis the plants. For this purpose we have found nothing better than four two-inch square stakes, about six feet long, driven into the ground in a square of about sixteen inches around the plants. From four to six branches are allowed to grow up within the space enclosed (the others being removed as they appear), and are held therein by strings around the stakes, kept in place by occasional tacks. We think, however, that, except in very heavy and wet soils, more satisfactory results will be secured from unpruned plants which are allowed to rest on the ground.

Detroit, Mich.

Will W. Tracy.

Winter-flowering Begonias.

BEGONIA, Dr. Nachtingale, is a garden hybrid, evidently closely related to *B. nitida*. Like that plant, it is deliciously fragrant. Its habit is better than the type, being less angular. The panicles and also the individual flowers are larger and of a clear bright rose-color. It is very floriferous, never at any time being out of bloom.

After two years I have succeeded in growing well-flowered plants of the distinct and beautiful hybrid known as *Gloire de Sceaux*. A figure of it appears on page 185, vol. vii., of GARDEN AND FOREST, which, as stated in the accompanying description, does not do it justice. It is a neatly growing bushy plant, about a foot and a half high, well furnished with nearly orbicular, deep bronzy green leaves. The flowers appear near the ends of the branches in short scape-like panicles, and, unlike most of the shrubby kinds, the male flowers are the largest, showiest and most persistent. The flowers are clear pink, sepals and petals rounded, and nearly equal in size. This is the only characteristic of the pollen parent, *Begonia Socotrana*, visible. In foliage and general habit it resembles its seed parent, *B. subpeltata*. We grow it in good rich loam with plenty of drainage and in a shady position in a greenhouse at an intermediate temperature.

Begonia Haageana is a very interesting and beautiful species, evidently related to *B. Scharffiana*. It makes a handsome specimen plant, whether in bloom or not. The leaves are light bronzy green, irregularly ovate, tapering and covered on both sides with a rather bristly pubescence of reddish brown hairs. It flowers sparingly all the year round in large rambling panicked cymes of light pink flowers. Both the sepals and petals in both the male and female flowers are covered on the outer surface with brownish hairs, a character not common among Begonias. Outside this type the only other kind I remember with this peculiarity is the well-known *B. metallica*.

Begonia Credneri is another of these hairy kinds. The whole plant is stouter, with a more deeply bronzed tint. The leaves are rounder and more bluntly pointed. The inflorescence is quite erect; the flowers nearly white, and almost covered on the outside of the sepals and petals, and the ovary with bright red hairs. It is quite as handsome a plant as *B. Haageana*, but not so free in growth.

Paul Bruant, a short-jointed, erect-growing, bushy kind, with irregularly cordate, deeply cut and wavy deep green leaves, is one of the best I know of, for window decoration. The flowers occur in large drooping panicles, reddish pink in color. Only the female flowers are persistent, and with large red-winged ovaries make a very pretty effect. I have known a plant to remain well in bloom for six weeks in an ordinary house window.

When Mr. Veitch, of London, was here a year ago, he was surprised to see large, well-flowered specimens of one of their recent hybrids, *President Carnot*. It is a robust-growing hybrid, and had been a small plant the spring previously.

Planted out for the summer, with unrestricted root-room, it had made strong canes four feet long and very stout, without blooming, having been used for tropical effect, for which it is extremely well adapted. It lifted well, ripened the stout wood it had made and bloomed profusely all winter long. This year I thought to make neater specimens by growing them in pots, but results prove the plants have not the stamina for a good show of bloom. The paniced cymes are very large, drooping from near the ends of the branches, and if the branches be long, as when the plants are grown out-of-doors, they have a somewhat leggy appearance. These branches root easily any time during the summer, develop the panicles which show in the bud state when the cuttings are taken, and make neat little specimens which can be planted out the succeeding summer. The individual flowers are very large. The whole flower, including the large winged ovaries, are bright coral-red, from which we may probably trace its parentage, on one side, to the old *B. (rubra) corallina*.

Ferdinand de Lesseps is another of these large hybrids into which the blood of the bronzy leaved *Begonia olbia* has been some way infused. This is evident in the short, almost hidden cymes, and in the reddish bronze under-surface and margined leaves. This, also, is better for a season out-of-doors, needing age and well-ripened growth to bloom well.

Wellesley, Mass.

T. D. Hatfield.

Siegesbeckia orientalis.—Last June we received from the Royal Botanic Gardens, Buitenzorg, Java, a large number of packages of seeds, principally natives of that island. I sowed the greater portion as soon as they arrived, and have been much interested in watching their developments. The above-named plant was in the collection, and though by no means ornamental, it is interesting botanically. My first impression of the plant when it began to flower was a miserable weed. It is an annual, and belongs to Compositæ. The leaves are cordate, with coarsely serrated margins, four inches long by two inches wide. The flowers are small and yellow, and rather inconspicuous, but the flower-heads have, in addition to the scales with which Composites are surrounded, five spreading, rather long, involucreal scales, which are covered with glandular hairs, each having a drop of viscid fluid at the tip. These hairs catch insects, apparently with the same ease as *Droseras*, as there are numbers of small insects caught on the plants we have here. Whether these insects are of any use to the plant after being caught is a problem for botanical students to solve. I do not know of any insectivorous Composite, and possibly the viscid glandular hairs are for a protection for the flowers from small insects, yet from their spreading position and the smallness of their number this is hardly probable. Many plants have sticky hairs on the stems and flower-stalks, to prevent ants and other insects climbing and stealing the nectar; as, for instance, *Browallias*, *Cupheas*, *Primulas*, *Plumbagos*, etc., but I do not remember ever seeing them hold insects, as this plant does. *S. orientalis* is by no means a rare plant, as it is largely distributed through the tropics, under the name of *S. droseroides*, apparently from the resemblance of its involucreal scales to the leaves of *Drosera*. It is well worthy of a place in botanical collections, and I find it does best in the warm temperate house.

Northampton, Mass.

Edward J. Canning.

Cytisus racemosus.—This is a common greenhouse shrub, and one of few plants with yellow flowers which are available to any extent for winter and spring decorations. It can be had in bloom from January onwards. By regularly pruning into bushy shape, plants may be grown for many years and make large specimens. This is practiced only in private places; for commercial use new stock is annually raised. Cuttings are taken from half-ripened wood and put in pots filled with sandy peat, or in a cool propagating-bed to callous. Afterward, a bottom-heat of sixty-five degrees, Fahrenheit, will induce new roots, and the cuttings should be ready for potting off in two or three weeks. They should be grown continuously in small pots for the first season, as it is almost impossible to lift plants which have not previously formed a ball of earth. Small plants rooted last spring and grown to a single stem in four and five inch pots are perfect pyramids from one to two and a half feet high, showing bloom for nearly the entire length of the stem.

Wellesley, Mass.

T. D. H.

Ceclogyne cristata.—Next to *Cattleya Trianae*, this is the most useful Orchid of the midwinter season. The abundance of its snowy flowers, its dwarf habit and dark glossy foliage make it truly beautiful at this season. The flowers, which measure

about four inches across, are produced in loose racemes resting on the foliage. Except for the rich golden-yellow fringes inside the lip, the color is pure white. The bracteate peduncle springs from the base of an oblong, shining, bright green pseudo-bulb of a walnut's size. The pseudo-bulbs are formed on creeping stems, and bear one or two long strap-shaped leaves of a dark green color. A cool well-ventilated house in a northern position is best in summer, and during the flowering season the plants should be kept in the coolest part of the greenhouse. While growing they need frequent syringing and watering and occasional fertilizing with weak liquid-manure.

Newark, N. J.

N. J. R.

Correspondence.

The Pepper-tree for House Culture.

To the Editor of GARDEN AND FOREST:

Sir,—Your recent article on the Pepper-tree leads me to add that it is readily grown from seed and makes a pleasing window plant. I have a plant now over five feet high, with the characteristic drooping branches. Daily showering seems to induce floriferousness. It has thus far never borne fruit. It is peculiarly free from all insects save the scale, which seems to have a special liking for it. I have tried in vain to discover why the apparently spontaneous movement of the leaves in water is at times so much more marked than at others, and suspect your statement that "in wet weather the leaves emit a pungent odor," has given me the clew.

Klinger Lake, Mich.

B. L. Putnam.

Meetings of Societies.

Horticulture in Pennsylvania.

THE thirty-seventh annual meeting of the Pennsylvania Horticultural Society was held in West Chester last week. In the interesting report of the Fruit Committee it was said that in the south-eastern counties of the state the fruit crop was unusually abundant, being in many sections the heaviest known, while in the greater part of the state there was a slender crop, owing to late spring frosts and a dry summer. In the north-eastern part of the state the Pear blight was more destructive than it has been for twenty years. Peaches only yielded from one-tenth to a quarter of a crop; Cherries in the south-east gave a small crop, Early Richmond, Montmorenci and Napoleon Biggareau being the best varieties. Of blackberries there were practically none, and but few raspberries and strawberries. It was reported also that the San José scale, which seems to have established itself securely in the east, had already been found in half a dozen different parts of the state.

The subirrigation of Strawberries was discussed in a paper by Mr. Martin Brinser, of Middletown, who stated that there were two ways of practicing this. One was by supplying water through tiles laid underground, and the other by subsoiling, so as to hold the rain-water. This last method is quite satisfactory where there is a compact soil beneath. Deeper plowing makes a deeper reservoir, which holds more of the winter and early rains. After plowing deeply the land can be subsoiled so as to loosen the soil to a point sixteen inches below the surface. In this way Mr. Brinser had produced excellent crops of cherries during the last dry year. In addition to the subsoiling, Mr. Brinser used frequent shallow culture, which furnished a dust mulch, so that during the dry weather moisture could always be found an inch below the surface. Mr. Ingraham, of West Chester, said that he had tried subsoiling several rows of Strawberries at the foot of a hill, and the beneficial results were plain. Mr. H. M. Engle argued that while some lands were aided by this practice, he had found that in loamy open subsoils not much benefit was derived. Mr. H. D. Van Deman, formerly Pomologist for the United States Government, thought that subsoiling was one of the very best practicable methods of storing up water for crops. A layer of finely pulverized soil resembles a sponge, and if it were three inches thick it would hold half as much as one six inches deep, and one one-third as much as one nine inches deep. Subsoiling has the practical effect of under-draining—that is, it makes a wet soil drier and makes a dry soil wetter. The deeper a hard soil is loosened up the more moisture it will hold, and plants require all they can get in this latitude. The object is to hold the winter rains in a reservoir rather than to allow them to run off. Professor Heiges told of some scions he had received from Oregon with their buds all started. He grafted them and then planted them in ground from which the surface soil was

thrown off, and the trench was then deeply spaded. After planting his trees he had the surface soil thrown back, and, in spite of the dry weather, ninety-five per cent. lived, and he believes that he would not have saved one-quarter of them if he had planted without such careful preparation.

Mr. Calvin Cooper, in speaking of fertilizers, urged farmers to secure their own nitrogen with the help of leguminous plants, in doing which they will be able to get some potash besides. Another member claimed that on the cyanite grasslands about West Chester commercial fertilizers gave no appreciable returns, while on the lighter soils farther south he had a farm on which he used four hundred pounds of complete fertilizers to the acre, and nothing else. He had continued this practice for ten years, sold everything off his land and yet his crops were increasing. Mr. Van Deman thought we did not sufficiently consider the fertilizing value of tillage, since this practice liberated the plant-food in the soil. He thought that millions of dollars were wasted every year in the purchase of commercial fertilizers. It was best for farmers to buy a high grade of muriate of potash, as it contains the least foreign matter, and either bone or dissolved South Carolina rock for phosphoric acid and then try to get nitrogen by trapping it from the air and soil water with leguminous plants. When we can catch nitrogen so readily we ought not to buy such an expensive material for orchard purposes. Some soils have enough potash, but it does not leach out if more is applied. An excess of nitrogenous plant-food makes a leafy, succulent growth, and some Peach growers in Delaware, who have plowed under heavy crops of Crimson Clover, have found that there was enough nitrogen in this green manure to hurt their trees. It is their practice now to cut the Clover and turn under the roots, which contain all the nitrates necessary. Potash and phosphoric acid are the two elements most needed in orchards. In a subsequent paper, Mr. Van Deman said that potash, phosphoric acid and nitrogen were of no use unless they were dissolved, and they could not be dissolved without water. Sap is plant-food dissolved in water; then nature mulches with leaves and the like to hold the water. As fruit growers cannot follow nature's way they should mulch by tillage. Plant deep, make a basin to hold water in and cultivate to keep it there. In speaking of irrigation, he said that a one-inch pipe with six-foot head ought to irrigate an acre. Mr. H. M. Engle, of Marietta, said that an inch pipe with eighty pounds head had supplied a quarter of an acre and they paid eighteen cents for a hundred gallons of water. Some of his crops paid for this expenditure, and others did not.

The pruning of orchards was the subject of an address by Mr. Calvin Cooper, who stated that he had set out an orchard thirty-four years ago, forcing its growth while young, and now his trees are overgrown and declining when they should be in their prime. Fourteen years ago he set out another orchard on comparatively poor ground, used no fertilizers and pruned the trees freely. He starts the tree with three branches and a leader and allows branches above, but leaves an open top. The best sprayer he could find three years ago would not reach the top of these large trees. Two years ago he cut off from ten to fourteen feet from the top of each and thinned them out, and now he gets good fruit. He uses an Excelsior sprayer, making three applications of Bordeaux mixture and Paris green and occasionally some clear copper sulphate before the buds swell, if the scab was bad the year before. Varieties that do not grow upright he prunes so that the last bud is on the lower side of the limb, while those which tend to spread have the last bud on the upper side. When pruning is done in winter the bark is bruised less than at other seasons, and it will not hurt the tree if the wood is slightly frozen, but it is better to prune at some time when the tree is entirely dormant. Mr. Gabriel Heieter, of Lancaster, pushes his trees as hard as he can all the time, then puts in a crop to check growth and throw them into bearing, and afterward feeds again. He thought that Apples must bear a crop every year if they are to be profitable. This means strong feeding and the control of insects and fungi, so that the leaves will be kept on the tree to make apples mature later and thus keep better. The finest fruit grows on young trees or on the young wood of old trees. On a rich soil a young tree will bear two or three crops in succession, and then, as the fruit-buds begin to crowd, it will bear only on alternate years. An annual bearer has its fruit-spurs separate. The top should always be kept young by going about the tree with long pruning-shears and taking out old spurs. A vigorous tree will be less liable to danger from frost than weaker ones.

The last afternoon was devoted to the subject of orchard planting, in which Professor Bailey made the principal address and answered many questions. In his opinion the hope of old

orchards is to plant new ones. His advice was to make the land rich and deep to hold moisture, although he thought that subsoiling would be of only temporary value. We never have rain enough in a summer to grow crops, and hence the need of tile draining, subsoiling and the use of deep-rooted plants to break into the subsoil as much as possible. The ground should be plowed in the fall, or some other device should be used for catching the winter rain. Clayey lands after hoed crops often run together and puddle if they are fall-plowed. For fertilizers Clover was advised for nitrogen, and two hundred to four hundred pounds of high-grade sulphate of potash and about the same of bone should be used every two or three years. Four-fifths of the orchards planted never amount to anything from lack of care, and this makes the field a more profitable one for those who give proper attention to selecting varieties and growing them properly. In his own orchard he is taking pains to work his trees over with scions from individual trees that are known to be doing well, and he will spray at least twice, once just before and again just after blossoming time.

The Minnesota Forestry Association.

THE annual meeting of this vigorous organization was held in Minneapolis last week, and, among other important matters discussed, was a proposition submitted by J. M. Cross, Esq., to the purpose that the state shall receive donations of stump-lands from lumbermen on the condition that they and their heirs shall receive one-third of the proceeds for one hundred years, after which they will revert to the state. One-third of the proceeds is to go to the state for the care of the land, and the remaining one-third to whatever institutions the donor may indicate. This proposition received much approval, and was submitted to a committee for action. The value of these stump-lands was a subject of much discussion. Most of them in the state are burned over and the seeds and seedlings destroyed. They should be taken in hand at once after they are cut.

Prairie forestry was another subject which commanded much attention. The failure of the Cottonwood for general planting was noticed, and the Ash and Bur Oak were spoken of most favorably, and after them the Hackberry.

The instruction in forestry at the University was shown to be more considerable than was generally supposed, since, under other names, it covered most of the branches of the subjects which are studied in Europe. Prairie forestry now receives the most attention, and the students have the actual care of a plantation of twenty acres. The care of natural forests has not received much attention, since, as yet, there has been no demand for skilled foresters. Experiments in caring for natural woodlands were strongly recommended, so as to secure data from which a policy could be formed. It was said that estimates could be made from observation in the woods we already have which would furnish facts or principles which could be used in constructing a system for the preservation of forests, and especially for their protection against fire.

Attention was called by D. R. McGinnis, of the St. Paul Commercial Club, to the fact that the water-supply of interior continental regions is diminishing the world over, and that the people of Minnesota had reason to use intelligence in preventing such droughts as threatened the interior of this continent.

A summary of the year's work seemed to show a substantial gain, especially in the improved management of the state lands and the establishment of a system of protection against fire. Other good work is under way, with a promise of favorable results.

Recent Publications.

Down the Lane and Back. By Uncle Matt. T. Nelson & Sons, London and New York.

This little book is a talk with children about a few of the weeds and wild flowers which one would naturally find along a country roadside in England. The illustrations are admirable, and the text is so instructive that we think it is a mistake that some one has not modified it so that it will suit an American wayside as well as an English one. This is the first book of a series, each devoted to a ramble, and their character can be seen from such taking titles as *Through the Copse*, *A Stroll in the Marsh*, *Across the Common* and *Around a Corn-field*. After all, many of the flowers described have made themselves as much at home

in America as they are in England. Here are Nightshade, Buttercup, Dandelion, Mallow, Bindweed, Marsh Marigold, Meadow-Sweet, Plantain, Harebell and Silver-Weed running wild—either the identical ones figured, or such near relatives that the picture of one will answer for both—while the Corn Bluebottle, Ragged Robin, Wild Hyacinth and many more can be found domesticated in country gardens, so that the little books can be used to a considerable extent as manuals for young botanists even on this continent.

Notes.

It is estimated that in Ventura County, California, alone 15,000 tons of Lima beans and 7,500 of other beans are raised annually.

We learn from *Le Petit Republicain de l'Aube*, published at Troyes, France, that Monsieur Charles Baltet received the Prix Montyor for his book, *L'Horticulture dans les Cinq parties du Monde*, from the Société Académique of that city at its meeting held on the 18th of December last.

The latest results of comparative experiments with bone meal and other phosphatic fertilizers seem to show that the superior value hitherto given to the undissolved bone is due to the nitrogen which it contains and not to the phosphoric acid. As a phosphatic fertilizer bone meal gives no better results than the mineral phosphate.

In an address recently delivered in Munich, Dr. Baur, Rector of the Ludwig-Maximilian University, mentioned that sixty per cent. of the wood now yielded by the state forests of the kingdom of Saxony is used in the manufacture of paper pulp. In other European districts there is likewise a great and growing demand for timber for this purpose. And the extent of the demand in this country may be divined from the fact that pulp mills have been built at seven places in the single county of Penobscot, in Maine, and that the daily product of three of these mills constitutes a train-load of paper pulp, usually consisting of eighteen or twenty car-loads.

Dr. D. T. MacDougal has taken pains to verify the results of former experiments, which show that the leaves and stems of adult plants of *Cypripedium spectabile* and *C. pubescens* exert a poisonous influence on the human skin. Later tests with both these plants and *C. parviflorum* establish the fact beyond doubt that all three of these species are poisonous. The irritant action is found to be due to a secretion of the glandular hairs. On account of the extremely small quantity of this secretion its exact chemical nature has not yet been ascertained, but it was found soluble in alcohol and gave the reaction of an oily substance. The irritant action of the plants increased with their development and reached a maximum effect during the formation of the seed capsules.

A memorial has been addressed to Congress by the legislative assembly of Arizona, asking that the lands covered by the famous "petrified forest" should be reserved as a public park. They form an area about twelve miles square and lie in the heart of the Apache country. But, despite the remoteness of the spot, curious tourists have already wrought much damage to the singular and beautiful petrifications, commercial enterprise has been active in the exportation of specimens, and even the residents of the country who do not try to make money out of the "forest" seem also to be active in willful depredations. It is reported that, not long ago, a cow-boy rode his horse over the most remarkable petrified trunk, which forms a natural bridge above a ravine, in the mischievous hope that he might thus break it down. There are no settlers upon this tract of land, and therefore its reservation would not injure or even inconvenience any one, while it would preserve an array of natural curiosities which are unique of their kind and as interesting to the lover of the picturesque as to the scientific student.

For many years the boxes in which plug tobacco was packed in the United States were made of Sycamore lumber (*Platanus*), which, owing to its properties of great strength and freedom from all odor, made it the favorite wood for this purpose. It is now stated by *Hardwood*, however, that there is not enough Sycamore lumber manufactured in the United States to supply twenty-five per cent. of the plug tobacco boxes used annually, and that Gumwood, Liquidambar, is going to be the popular wood for this purpose, if it is not so already. Formerly the plugs were pressed by powerful machinery directly into the boxes, which therefore had to be made of some strong wood.

Most manufacturers now, however, have iron or steel moulds into which the plugs are pressed into a body of exactly the size of the wooden boxes in which they are marketed. This plan allows the use of lighter boxes without cleats or corner-pieces; and many of these light boxes are now made from three thin layers of Gumwood, the middle layer being placed transversely to the other two and the whole solidly glued together under great pressure. Gum boxes made in this way are said to be substantial and durable. Rock maple and black birch are also used in some factories for tobacco boxes, but probably not to any great extent.

We have often spoken with regret of the wanton destruction of song-birds in this country, not only because their beauty and melody are a delight to all who live in the country, but because they are such important auxiliaries in the war against insects injurious to vegetation. This wholesale butchery is by no means confined to our own country. A recent number of the *Fortnightly Review* states that forty thousand larks daily come into the London markets, where poulterers sell them by the bushel. Besides those sold for table purposes, there are thousands killed for their feathers, their wings, when dyed so as to counterfeit tropical birds, being worn for ornaments. Large numbers are also trapped to let fly at shooting-matches, and many more are sold to be confined, not as household pets, but by gamblers, who, strangely enough, keep them and bet on their powers of song, although how such matches are decided one can hardly understand. All this makes agriculture and horticulture more difficult in England, where, under any circumstances, it is none too prosperous. But what seems surprising to Americans is that public sentiment in England will allow the extermination of a songster which seems to be such a favorite and holds so high a place in the poetical literature of the language.

A few boxes of grape-fruit from southern Florida and, perhaps, fifty barrels from Jamaica made up last week's supply for this city. The Jamaica output is nearly exhausted; much of this fruit now coming is of hybrid origin, and other, no less inferior, is gathered from old and neglected trees. This small thick-skinned fruit sold for \$5.00 a barrel, while large specimens, with the fine quality of skin known in the trade as silky, readily brought \$7.00 to \$8.00 a barrel at wholesale, and the choicest from Florida commanded \$10.00 a box. On Monday of this week a dozen barrels from Jamaica were eagerly bought up on the dock at \$12.37 each, and owing to the scarcity and prevailing high prices so small a lot as two boxes was included in a large shipment of citrus fruits received from California on the same day. Grape-fruit has been known in this city only about twenty years, and so little was it appreciated fifteen years ago that some of each lot from the Bahamas was reshipped to England, where the prices, \$7.00 to \$8.00 a barrel, were double those obtained here for a very limited quantity. During the last five years the demand has increased rapidly, and each of the past few years has seen the supply doubled, until this season of scarcity due to the freezing of the trees in Florida last year.

In the recently published report of the Dean of Barnard College, in this city, which covers the year 1895, we read: "In view of the importance of her work, the responsibility she carries, and the learning and ability that enable her to bear it, the title of Professor of Botany has this year been conferred upon Dr. Gregory, with the approval of the President of Columbia College. Her department is doing its full share of university work, besides containing successful classes of special students and undergraduates. It has this year four candidates for the higher degrees and five for the Barnard Certificate. Its exhibit at the exposition of the Academy of Natural Sciences attracted much favorable attention. The department is one which has been of interest and usefulness to the community. But, though its progress is gratifying, it is also expensive. Professor Gregory reports that it is impossible to carry out our plans in regard to advanced work with our present equipment. A much-needed course in plant physiology, for instance, calls for materials and apparatus which are not at our command." The state of things which the Dean thus makes plain seems to offer a good opportunity for practical benevolence to some person of botanical tastes who is likewise interested in the higher education of women. Certainly there is no pursuit in which certain qualities which have always been considered characteristically feminine ought to make themselves felt to better advantage than in the higher branches of botanical research. We mean those qualities of patience, perseverance, careful attention to details, preciseness in observation and delicacy in manipulation which this branch of science conspicuously demands.

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The Shrubby in Winter.

IN another column a correspondent calls attention to some winter effects in the wild shrubby which interested him, and, perhaps, it is worth while to repeat what we have often said—that when home-grounds are planted there are many cases where more attention should be given to their winter aspect. Where a house is occupied in summer only, the principal aim should be to make it attractive at that season. There are many trees and shrubs which are conspicuously beautiful in spring and autumn, and, of course, there are places where the selection of species and varieties should be made with special reference to these seasons. But where a country house is occupied in winter it can readily be seen that in some part of the grounds commanded by the windows of rooms appropriated for winter use provision should be made for the prospect at this season. In the middle of this century it was not uncommon to have a glade or lawn in such a position bounded by Spruces, Firs, Hemlocks, Pines and other conifers with such broad-leaved evergreens as Kalmias, Rhododendrons, American Hollies, and some herbaceous plants with persistent foliage, like Yuccas, for example, and the whole brightened by a few shrubs with colored fruit, like the Carolina Rose, Black Alder, Cockspur Thorn, Snowberry and Bittersweet. Such an arrangement has some merits, although the idea that this green foliage brought in a touch of summer when January was at its bleakest was rather fanciful. Any effort to produce summer scenery in winter must be a failure, as, indeed, it ought to be, for what is desirable at a particular season in the landscape is an effect which will harmonize with the prevalent tone of that season, rather than one which conflicts with it. As a matter of fact, however, there is no hint of summer in the winter aspect of evergreens. In freezing weather their darkened foliage only emphasizes the strength of the cold, and the particular human interest they have at this season is their hospitable suggestion of shelter against the driving winds. Whatever is especially home-like and companionable or genial in their winter appearance is not that they remind one of summer verdure, but that they are sturdy enough not only to brave the wildest weather, but to give us some protection against its blasts.

Following the fashion imported from the mother country, coniferous trees were too exclusively planted in the early years of the century, and we can all remember country houses which were half-smothered in summer under the gloom of their heavy foliage. Perhaps the reaction against this has been too decided, and some of these trees which are beautiful at all seasons are too much neglected. Nevertheless, there is an abundance of beauty and variety to be found in deciduous trees and shrubs at this season, and in any scheme of planting for winter effect in this climate they should have the largest place. Most trees have a beauty in winter which is quite as distinct and individual as it is in any other season. Indeed, this is the best time for studying the peculiar structure or framework of a tree—that is, for noting how its branches diverge and the manner in which they break into spray. The special characteristics of a particular species, whether of dignity or grace, are shown as well when the trees are stripped of their summer garments as at any other time, and never until the leaves are gone can we mark the peculiar beauty of the different figures made by the interlacing branchlets against the sky. There is no need to speak of the endless varieties in the shade and texture of the bark, both of trunk and limb and spray, and it is well known that the richest colors in a winter landscape are those of the warm browns of a distant wood. The colors of the small twigs are especially varied, too, and the tinted mist which hovers over a shrubbery a few hundred feet away is collected from the mingled colors of the bark on the smaller branches.

This brings us to a point in planting shrubbery for winter effect which we wish here to insist upon. In former articles we have given lists of various shrubs which are ornamented with brightly colored fruit until midwinter, but we have not so often named those whose bark lends a pleasing color to the short days of the year. The glossy green branchlets of the Kerrias, the golden bark of the Willows which warms into still brighter yellow with the approach of spring, the ashen gray of some of the Viburnums and the scarlet twigs of the Dogwoods make pictures of unfailing beauty, either against the glittering snow or the brown earth. Taking the Cornels alone one is surprised to find the variety of form and color they display at this season. Our common Red Osier, *Cornus stolonifera*, with its broad leaves, pale flowers and bluish white fruit, is ornamental all summer. Its leaves turn purple and yellow in autumn, and now its purple-red branches sustain its beauty in midwinter. There is a variety of the plant, too, with golden-yellow bark, specimens of which have been exhibited by Mr. Warren Manning at the Massachusetts Horticultural Society, and it is distinct and striking. *Cornus alba*, the common European Red Osier, which is often sold by nurserymen as *Cornus sanguinea*, is another bright-barked plant. It is a variable shrub, and one strain, which is called *alba Sibirica*, has stems of almost vermilion. *Cornus circinata*, too, one of our native species which is found on wooded hillsides, in addition to its beautiful flowers and light blue fruit, has red and yellow stems which are sometimes finely mottled, while *Cornus candidissima* has an ashen gray bark of a singularly soft texture. Certainly a group of these Cornels properly arranged gives a pleasing stretch of varied color, and with judicious selections from other families, by harmonious contrasts, a most interesting feature can be added to our winter landscapes.

The San José Scale in New Jersey.

IN our report of the late meeting of the New Jersey State Horticultural Society, brief mention was made of a paper on the San José scale by Mr. Charles R. Parry, in which he described its destructive nature, the spread it had made in the state of New Jersey, and asserted, from his own observation and from information obtained during his visit in California, that certain natural enemies were controlling it in that state, and that the growers had ceased to regard

it as a pest to be dreaded, largely because of these natural enemies. These enemies, certain ladybirds imported from Australia against the fluted scale, Mr. Parry had tried unsuccessfully to introduce into New Jersey, and he argued that the best hope for the control of this destructive pest in that state lay in securing a supply of them. The paper brought out some discussion, and it was held by some of the most careful observers that differences of climate would prevent the ladybirds from being as effective here as they are in California. Since this meeting we understand that a flying visit through the infested regions has been made by the Entomologist of the New Jersey Experiment Station, who has discovered that Mr. Parry's assertions concerning the spread of the scale were unfortunately too well justified. In many orchards where the presence of the scale had not been previously suspected it was unpleasantly conspicuous, and one case was discovered where the insects had been carried for nearly, if not quite, a mile in a straight line, probably by the agency of birds. In the course of an address before the New Jersey State Board of Agriculture, held at Trenton January 14th, Professor Smith called attention to these facts and to the danger threatening the fruit industry of the state. So much alive were the farmers to the importance of the subject-matter that, after some discussion concerning the probability of a successful importation, a resolution was adopted, asking the Legislature of New Jersey for an appropriation of one thousand dollars for the purpose of importing into the state of New Jersey such of the predaceous or parasitic insects as might be found feeding upon the scale in California or elsewhere. The resolution was unanimously adopted, and was at once referred to the legislative committee and will be pushed as soon as the Legislature reconvenes. There is no doubt as to the importance of the matter, and there is no doubt that the state of New Jersey owes it to so important an industry as that of fruit-growing to offer it every possible measure of protection. The sum asked for is ridiculously small compared with the possible benefits, and there seems to be at least a fair chance of success. Of all the Atlantic fruit states New Jersey is worst infested and has most to lose, while offering unusual facilities, from its numerous closely set orchards, for the spread of the scale.

Perhaps it is worth stating that the late Dr. C. V. Riley, by whose advice the predaceous insects that so completely destroyed the Cottony Cushion scale were introduced into California, after visiting that state early in 1895, argued at a meeting of the Entomological Society of Washington that an attempt should be made to import the coccinellids from the Pacific to the Atlantic coast. The opinion of so conservative a man ought to have some weight in a question like this, and we think that there is sufficient probability of success to justify the experiment.

Self-reliance in Farming.

IN a recent editorial article in this journal it is said that one advantage of a broad education in agriculture is that it makes more self-reliant men, and I am prompted to add a few observations on this subject. For many years the farmer has been scolded on every hand for following the ways of his father and grandfather in managing his farm. This steady rain of advice, urging him to turn from the accustomed ways of his fathers, was freely offered even before there was sufficient knowledge of a true science of agriculture to give the advice any specific merit. If the farmer must take up new ways, it was not too much to ask that these new ways be defined and described. But, for the most part, no adequate method of revolution was proposed, although it was easy to see that there was reason enough for a change. Under the circumstances, the farmer, of course, did little or nothing. He felt that little could be gained by jumping from the frying-pan when the chances were that he would land in the fire. He accepted the advice as good on general principles, but he saw no way of paying mortgages with it.

Now all has changed. With the advent of the experiment stations and the Babel of new teaching, there are methods and to spare for the improving of farming. The farmer will be scolded no longer. He will convert himself to the new ideas forthwith, and he will ask for advice and help in every emergency; for, were not the stations and the agricultural colleges made for his benefit? But, really, the great danger now is that the farmer will lose something of his accustomed balance and self-reliance, and desire a doctor from an experiment station whenever a strange bug or a perverse soil perplexes him.

Every experiment station is burdened with questions which it cannot answer, and never can answer. They are local questions—questions which do not have to do with principles, but with the particular matters which pertain to the one farm or to the personality of the farmer. The commonest question of this type is, "What varieties shall I plant?" Now, this question no one can answer for another. It is purely a local and personal question. For myself, I invariably refuse to advise. I am willing to say that I know some varieties which please me, and to name them, but I cannot advise any one else to plant them. The question really shows that the questioner has not yet mastered and adopted the fundamental principle of the modern teaching, which is that every man must manage his farm as seems best for his particular conditions and aspirations. If he asks what varieties of apples he shall plant for drying, or what he shall plant for the foreign markets, then a more direct answer can be given him; and the questioner has arrived at the point of observing that successful farming is not copying after others, but is the working out of a local problem.

All this is equivalent to saying that the experiment station and the agricultural college do not exist for the purpose of managing everybody's or anybody's farm. More than ever before, the farmer must collect opinions and evidence, then weigh them and choose. The stations should enunciate principles—illustrating them by concrete examples—rather than lay down rules.

Cornell University.

L. H. Bailey.

Trees of Minor Importance for Western Planting.—II.

THE Russian Mulberry was brought to America in great numbers by the Mennonites, who, during the decade following 1870, settled in large colonies in Marion, McPherson and Harvey counties, Kansas. By them it was introduced to their American neighbors, and was quite extensively planted in that vicinity. Many of these planters seem to have expected too much of it, for it has evidently declined in favor in recent years. As grown in this section, it is notably polymorphous in fruit, foliage and form of the head. Varieties appear bearing pure white fruits, and others deep black ones. Occasionally a tree of the black-fruited sort appears to be wonderfully productive. I have seen the fruit sold in the market, bringing six to ten cents a quart, but the demand is not great, and the bargain is a poor one for both buyer and seller. The fruit cooked with gooseberries or other very acid amendments is palatable, and in the absence of blackberries and raspberries is not altogether to be despised.

Throughout central Kansas and eastern Oklahoma *Morus rubra* is native to the streams, and though not common, wild or cultivated, makes a good tree. In the scattered instances where I have seen it planted it gives a uniformly vigorous growth, with clear straight trunk, symmetrical top and dark rich foliage. It seems to me that it should have had a more extensive trial in timber plantings.

The western limit of the Sycamore, *Platanus occidentalis*, runs through Salina, Marion and Winfield, Kansas, and Guthrie, Oklahoma. East of this line it is neither abundant nor uncommon along streams, and within its natural territory is sometimes used as a shade tree or for streets. It seems to be well adapted to street-planting. The best planted specimens I have seen are at Manhattan, Kansas, where one tree in particular, standing by itself and having

a remarkably straight and symmetrical form, has always met my warmest admiration.

The Hackberry is indigenous over as great a longitude as almost any western tree, yet it has very seldom been planted. I know of no plantings from which any judgment of its value might be formed.

University of Vermont.

F. A. Waugh.

Water against Frost.

OF course there is no way of protecting plants or crops from injury when the temperature falls several degrees below the freezing point, but for light frosts the practice of burning any material that will form a dense smoke has been found useful in vineyards by forming a canopy over the field, which prevents the escape of heat by radiation from the ground. Protection by water is, however, more practicable than protection by fire, and we condense the following notes from an article by Professor Kedzie, of the Michigan Agricultural College, which appeared originally in the bulletin of the Michigan State Weather Service:

The vapor of water in the atmosphere may control excessive changes of atmosphere in two ways: (1) By condensing into water, it liberates enough heat to raise through one degree the temperature of a thousand times the amount of water condensed, and hence it arrests the fall of temperature by giving out heat. In this way the beneficent dew becomes a warming-pan for chilling fields. (2) Vapor of water in the air as well as clouds prevents the escape of heat by radiation from the soil, and the consequent cooling of the air by night. But for the vapor of water in the air we should have a frost every night in the year. Professor Tyndall says that the removal for one summer-night of the aqueous vapor which covers England would bring about the destruction of every plant which a freezing temperature could kill.

If the farmer is forewarned of the approach of a slow frost he may do something to avert the calamity. The old plan of a tub of water under a fruit-tree with a rope reaching from the tub into the branches may serve a useful purpose. The evaporation from the water in the tub and of the water carried up through the rope may spread a water blanket about the tree. Of course, such an appliance, while of some use in a small garden, would be futile on the farm. The shallow cultivation of hoed crops draws by capillary action upon the reservoir of water in the subsoil and keeps the surface soil in a condition which prevents the rapid distribution of soil moisture, and in this way saves the fields from frost by a covering as impalpable as air, but as effectual as eider-down. One night the Indian Corn in Michigan was almost entirely killed by frost, but a few fields on the banks of rivers and the borders of lakes were spared. In these fields the Corn-stalks next morning were dripping with dew. There had been but one-eighth of an inch of rain in two weeks, but evaporation from river or lake had moistened the air and staved off the frost. If the air over the whole state had been as moist as it was along the rivers a heavy dew would have fallen everywhere, and the corn crops would have been saved. Beds of Coleus and other tender plants which have been thoroughly wet down with cold water in the evening have escaped frost in October when other plants near by were killed, and grapes have been saved by drenching the vines with water. Strawberries and Grapes in blossom may be saved in the same way if a good supply of water and a sprinkling hose are available when there is threatening frost. Even after severe frosts grapes have been saved by thorough drenching with water early in the morning.

Mr. E. P. Powell says that the best preventive against frost is a thorough spraying with water during the evening and night. By this means the danger from a fall of two or three degrees can be averted, and this will often save a whole crop.

Foreign Correspondence.

The English Fruit Market.

ONE of the leading salesmen of Covent Garden Market, Mr. G. Munro, lately dealt with the subject of the fruit-supply of England in a paper read before the Horticultural Club. It is difficult to arrive at even an approximate estimate of the annual consumption of fruit in the United Kingdom, but as the bulk of what is placed upon the market passes through Covent Garden, Mr. Munro is in a

position to gauge the supply with some approach to accuracy.

There are between seven and eight hundred porters employed day and night in Covent Garden Market in unloading and delivering English produce, and one hundred and fifty on the average employed on the foreign supply. Many English growers, and not a few among the foreigners who send fruit to England, find it advantageous to consign their produce direct to large centres all over the country, such as Manchester, Leeds, Glasgow and Edinburgh. Mr. Munro stated that the English are becoming much larger fruit-eaters than they were, the demand having increased to such an extent that the principal growers find it more profitable to become specialists. "The grower who sends the largest quantity of a good article regularly, makes a large connection for his goods, large consignments often selling to better advantage than small ones, though the quality of the latter may be equally good."

Where the foreign grower competes with the English in supplying the same kind of fruit he generally succeeds for the following reasons: 1. He packs his fruit carefully and honestly and never fails to grade it. 2. He grows only sorts that are sure to sell, and in such quantities that he can keep up a regular and continuous supply. This is shown in regard to apples, which are rarely a profitable crop with the English grower, notwithstanding the suitability of our climate for this fruit and the fact that English apples are far better in quality than any foreign. "I was in a large wholesale store in Manchester this autumn where they had English and American apples side by side, and on asking the quantity of each sold I was informed about three thousand bushels of American against one hundred bushels of English, and simply because the packing of the latter could not be depended upon."

Apples are imported into England nearly all the year round, commencing in April from Tasmania, followed by supplies from France, Italy and Germany, and in winter from the United States, Canada and Nova Scotia. American apples are better in flavor than those from Tasmania, and, as a rule, they sell at prices which would scarcely remunerate the English grower. Mr. Munro does not deal with the question of cost in producing, nor yet with the relative uncertainty of the seasons in England.

Pears are imported chiefly from France, Italy and California, the latter arriving in excellent condition and being of good flavor. About a thousand cases weekly of Californian pears, chiefly Easter Beurré, arrive in December, and about six times that quantity in September. Strawberries, currants and cherries are imported in enormous quantities from France and Spain. Plums, such as the Green Gage, are received from Italy, France and Germany for a period extending over about three months before the English crop is ripe, as many as ten to fifteen thousand flats being often sold daily in Covent Garden alone. Thus, the English consumer gets a surfeit of these fruits by the time the home supply is ready.

Pineapples are received in shiploads from the Azores, and although the prices they realize are much lower than they used to be, the supply is steadily increasing. The cost of producing pineapples in England is so great that an English-grown pineapple is a novelty in the market. Pineapples are also received from Africa and Florida.

Bananas are sold in increasing quantities annually, the quality of the fruit being superior to what it was before, now that choice sorts are grown and greater care taken in the transport. There are much better sorts known even than the best of those grown by exporters now, and if only growers will take trouble to secure these the demand for this most delectable of fruits will increase greatly. The ordinary banana of the fruiterer is mawkish and poor in flavor compared with the fruit of such varieties as Ran-Kela, Champa and Pisang Rastalei. Mr. Munro stated that the bananas received in London and Liverpool in November last, from the Canary Islands alone, numbered nearly thirty-seven thousand bunches.

Peaches and nectarines grown in England, if of good quality, find a ready sale, and suffer nothing from the competition of foreign supplies, which are either of inferior sorts, unripe, or too much damaged to find much favor. Expert growers of these fruits contrive to maintain a supply from April to November by cultivating a variety of sorts under different temperatures. Mr. Munro says there were often a thousand boxes of English-grown peaches and nectarines disposed of daily last year in Covent Garden. I have tasted here peaches from California which compared favorably with the English-grown fruit.

Grapes are in greater demand than ever. Enormous quantities are imported from the Cape, Spain, etc., yet cultivators in this country find this fruit a profitable investment, the acreage of glass devoted to it being largely increased every year. I am told that good grapes grown under glass in England pay at one shilling per pound. The varieties cultivated are chiefly Alicante, Black Hamburg and Gros Colman. About one thousand tons of English-grown grapes are now annually marketed in this country, and nearly twice that quantity are received from the Channel Islands, where grape-culture has become a staple industry. Even Belgium sends forced grapes to the English market, about two hundred tons being received from that country last year, a prohibitive duty practically closing the Paris market to them.

Cucumbers at one time were largely imported from the Continent, but now English growers supply the Continental markets as well as their own. Mr. Munro estimates the supply of this fruit from March to the end of July at about fifty thousand per day.

The increase in the consumption of Tomatoes in England within the last ten years has been phenomenal. They are a certain source of profit to the beginner with limited capital, being easily grown and marketed and readily sold. The quantity of house-grown fruit that passed through Covent Garden Market alone from March to November is estimated at two thousand tons, and this is probably only a tithe of what is marketed throughout the country. I know a market grower in the provinces who cannot sell apples and pears at any price, while his tomatoes offered direct to the same consumers sold readily at sixpence per pound, the price asked for six pounds of apples. My friend proposes to leave the supply of apples and pears to the foreigners, and to devote himself entirely to tomatoes and cucumbers.

London.

W. Watson.

New or Little-known Plants.

Chrysanthemum, Mayflower.

THIS plant was raised in 1892 from seed of Fascination by Mr. John N. May, of Summit, New Jersey, and it was exhibited for the first time in the autumn of 1893, but it received comparatively little notice on account of the fact that it was rather too early for the great exhibitions. It was distributed in the spring of 1894, and at the autumn exhibitions that year it took prizes wherever it was shown, while the flowers sent to market by Mr. May brought higher prices than those of any other variety. The plants had a remarkable sale last spring, and in the autumn the flowers took the leading prizes in most of the great cities of the United States wherever white varieties were in competition. It is a first-rate flower for commercial purposes, and ranked last year in our leading markets as the best of its season. It is a sturdy grower, with large handsome leaves and remarkably stout stems, carrying erectly massive, though not coarse, blooms of a pure white color and of firm texture. It has the light and somewhat fluffy appearance of many Japanese incurved varieties, and the florets are wavy-twisted, the lower ones being reflexed (see fig. 5, page 45). It was at its best this year during the last week of October and a few days into November, though, with careful management, Mr. May thinks it can be carried well into the

middle of the latter month. Last year the largest flowers measured eight to nine inches through and from twenty-two to twenty-five inches over from the lower petals on one side to the same point on the other.

Cultural Department.

Lily Blight.

THE Lily blight, which has not troubled plants in this locality to any extent for a number of years, was noticed here last season on a good many species. It seems to attack *Lilium candidum* first, and spreads from it on to the other early sorts. I have noticed the blight on the fall growth of the leaves of *L. candidum*, and have wondered if it did not winter on these and spread in spring from them. It was noticed as late as December, after cold weather had set in. Of course, one's opinions formed from a single year's experience may not be correct, but, from what I have seen, I am led to believe that a timely and thorough application of the Bordeaux mixture will overcome it to a great extent, if not entirely. I was surprised to note that our native Lilies were among the first to be troubled. *L. Canadense*, *L. superbum* and *L. Philadelphicum* were troubled, but it did not apparently injure their bulbs. It may be that, though the mixture was applied to these after the disease had made considerable progress, it prevented its descending to the bulbs. *L. Humboldtii* and *L. croceum* bulbs seemed to suffer more than any others noticed. *L. Parryi* was cut down by it, but the bulbs were left apparently sound. *L. giganteum* and *L. cordifolium* both were injured. A bed of the two or three varieties of *L. speciosum*, which had come up very early and had been nipped by the late spring's frost, were cut back by the disease, while other lots of this same Lily were not touched. The bulbs of *L. speciosum* were not apparently injured, except that they did not make any growth. The blight had made a good foothold before I was prepared to apply the remedy, and on this account I believe that if I had taken it in season very little damage would have been done. It had gone so far that the flower-buds of *L. Leichtlini* began to droop and they seemed past help. I was surprised to see these recover after the first application and develop good-sized blooms. A friend who had been troubled with the disease, in another state, had advised me to cut down at once all stalks that had been affected. I did so with every plant of *L. croceum*, and they were injured in the bulbs the most of any. I believe if I had not cut them down, but had used the mixture on them, I would have saved all of the bulbs. I noticed that some species could be entirely cut to the ground with the blight and still no apparent damage was sustained by their bulbs. Others, like *L. Humboldtii* and *L. croceum*, would be affected. A bed of *L. Nepalense* had been planted very late, the bulbs having been brought that same year from Burma. As soon as these began to form leaves of any size they were attacked by the blight. I applied the remedy several times very thoroughly, and saved nearly all. They gave very fine blooms and were the last Lilies to flower, some buds opening after the leaves had frozen turning dark.

I think the best time to apply the remedy is before it shows itself, or immediately after. It will not do to wait long after the first spots are noticed. The mixture should be applied in a fine spray to the upper surface of the leaves and also to the stalks, so as to completely cover them. I found that the mixture was more effectual when used soon after it was prepared. To facilitate the application of the mixture I prefer to have my Lilies in rows, two or three abreast, and the rows far enough apart to admit a narrow cultivator. In beds it is almost impossible to touch all of the leaves and stems in the centre of the bed with the mixture. Of the Tiger Lilies, the variety called *Splendens* seemed free, or nearly so, while both the common Tiger Lily and the double Tiger Lily were affected.

The blight was noticed more or less on about every species I had, but on some of them it was very light. I noticed that *L. Henryi* seemed least affected, although it was near plants of *L. candidum*. This species, if it will stand cold weather, is one of the surest to succeed. Young Lilies, too small to bloom, were soon cut back. The blight seems to prefer their more tender leaves. A lot of small *L. Canadense* cut back in this way very early in the season were transplanted and the bulbs seemed to be perfectly sound. Young bulbs of *L. Wallacei* were affected, and when these were reset many had to be discarded. These had been entirely killed down to the ground before the mixture was applied.



Fig. 5 —Chrysanthemum, Mayflower.—See page 44.

The Lily blight is not new to this town. It was noticed here by Pringle fully fifteen years ago. It seems to come and go like the Potato blight, which it closely resembles in many ways. A part of last season was quite favorable to the development of both in this section.

Charlotte, Vt.

F. H. Horsford.

Cultural Notes on Orchids.

THE close observer of this class of plants, whether a cultivator or a plant physiologist, cannot fail to remark that there are certain periods of rest and activity that are well marked by the plant itself. Sometimes these periods do not conform to our seasons, but, for the most part, the plants adapt

themselves to the changed conditions under which they are placed, and respond to a rational system of treatment. It often puzzles the grower to know what to do with a plant that has apparently made its growth for the season early in the fall months and then makes another start, the later growth having to finish up during our winter months under adverse conditions as to light and air, the two most potent factors after warmth and moisture. This is frequently the case with newly established plants which have not quite adapted themselves to the changed seasons. Sometimes it occurs in the case of well-grown plants that have been in a collection, perhaps, for years. We have come to the conclusion that to try and retard this tendency by keeping the plants overdry at the roots is to cripple seriously latent energies; to place them in a warmer temperature with more moisture to encourage this growth results in throwing the whole mechanism of the plant out of gear. We have found it best to ignore the fact that anything abnormal is going on and to let nature rectify its own error, if error it be. Often this seems to be merely a safety valve for the escape of a superabundance of vigor, for, excepting the newly established plants, this peculiarity is confined to plants that are the most robust.

European cultivators, to whom we have been indebted hitherto for our works of reference on this subject, have laid great stress on the ripening up of growths by withholding moisture, but, aside from the fact that this system is not practicable here, owing to the greater amount of sun we get and the much larger amount of artificial heat required to maintain the proper temperature for the plants. All these conditions tend to exhaust the store of moisture, which in the case of a *Cattleya* bulb, whether old or new, averages over ninety per cent. Aside from these facts, the most advanced cultivators in Europe are beginning to see the fallacy of this system and to teach a more rational treatment.

It is also easily seen by the interested student that there are times when a plant is putting forth new efforts in the way of a bunch of young live roots from the base of the last-made growth. Often this is by way of fortifying itself for the crowning effort of producing flowers, and sometimes of recuperation afterward. In either case it will be found good practice to take advantage of these signs and to give any encouragement possible, such as new material and a larger pot if this is deemed necessary, remembering that decayed inert matter about epiphytal Orchids is death to roots, whether young or old. Care should be taken to remove every particle of decay by directing a jet of water on the mass before placing in new material. It would have been considered bad treatment by the authors of the reference-books to repot a *Cattleya* at the approach of the dull winter months, but it will be found here in practice that any day of the year is a good time, provided the plant shows signs of renewed activity at the roots, a sure index that will never betray either the plant or the cultivator.

Cypripediums are to be regarded more as terrestrial plants. They will take water freely all the year, and may be repotted at almost any time. This is a good time, as the roots are, for the most part, dormant, or have but few growing tips, and these are not so easily injured as the brittle white roots of the epiphytes. If a *Cypripedium* holds tenaciously to the pot in which it is, as is often the case with older plants of *C. insigne* and its hybrids, it is well to soak the roots in water the day before potting, and, if it is necessary, to break the pot to liberate the roots. The broken parts will easily separate when charged with moisture, and this is true of *Cattleyas* and other genera. It is not economical to spare the pot when the contents represent, possibly, as many dollars as the pot does cents. For such Orchids as require a quantity of water at all seasons it is safe to use sphagnum-moss liberally in the potting material. *Cypripediums* and *Odontoglossums* belong to this class. *Dendrobiums*, we find, do well in moss alone, for it can be easily washed out each year and new living moss added, but for *Cattleyas* we have for several years used no moss, and only the best grade of *Osmunda*-root. The moss, we find, only hastens the decay of the fibre, and when the latter is used alone there is no danger from overwatering, and the compost is well aerated at all times, a condition favorable to the development of good live roots, apparently the basis of vigor and success.

Much can be done to render the atmosphere agreeable to the occupants of our plant houses besides the ordinary applications of moisture on the paths. An occasional damping down with some liquid stimulant is desirable, and we have found that a minute proportion of sulphate of ammonia in the water has a beneficial effect, giving a healthy green color to the foliage. A quantity of Oak leaves brought in twice a year

and placed under the centre benches helps to give off ammonia. These should be well treated with air-slacked lime to prevent snails and other insects from coming forth, but I am told that the lime would help to impoverish the supply of carbonic acid gas, and in this way not be a benefit, although liberating the ammonia contained in the decaying leaves. Fresh air, as often as available, is one of the chief essentials to keeping a healthy atmosphere. This is not easy when the temperature is far below the freezing point outdoors, but a system of ventilators near the heating pipes makes it easy to warm the air as it comes into the house. Even in hot weather this is the better way to change the air in preference to opening wide the top ventilators and letting out all of the carefully balanced moisture-laden atmosphere we have been at so much trouble to prepare. Greenhouses are seldom constructed with openings in the brick-work for ventilation, but this is most essential for successful culture and should be more insisted upon than it is. Water also that is taken from the supply-pipes direct is far too cold in winter for spraying or watering. Here it averages forty-five degrees in the winter months, and it is not well to use it for spraying a house at from seventy to eighty degrees. We have in part overcome this difficulty by placing on the warmest flow-pipes a cylinder holding sixty gallons, and taking the water from this to the warm houses. The water is let in at the base of the cylinder and out at the top, and in this way we secure a supply of tepid water adequate to our needs at all times when fire heat is used.

White scale is the worst enemy the Orchid grower has to contend with; it comes on the plants as they are received from the woods, and increases at a rapid rate, but a fine jet of water, as from the Stott sprayer, will, if used with a good force, effectually rid the plants of this pest, and without the least injury to them.

In successful plant-culture it is the trifles that tell. Sometimes they are inappreciable to the cultivator himself and a puzzle to others, but more often they are wholly at the will of the careful student who avails himself of the signs given by the plants themselves. A system that is haphazard is likely to give results that correspond.

South Lancaster, Mass.

E. O. Orpet.

Greenhouse Notes.

WHILE the common practice of banking flowering and foliage plants in the conservatory for effect may be agreeable from one point of observation, and may be excused when following architectural lines, it is more advisable generally to show as much as possible the individual character of the plants. Lately I have seen some very fine trained standard plants effectively used in this way. One of these, *Adhatoda cydoniæfolia*, I found in the greenhouses belonging to Mrs. Pauline Durant, of Wellesley. This elegant rafter-plant, allied to the *Justicias*, and belonging to the *Acanthaceæ*, was introduced from Brazil in 1855. It is naturally of straggling growth, and in forming a standard one stout stem had been carried upward six feet and attached to a strong support. From a head made the branches diverged in all directions, arching outward and downward, some of them reaching the ground, forming a perfect pyramid. Nothing more beautiful than this plant in flower can be imagined, with bunches of large labiate pink-colored flowers borne on the tips of the branches. It is an easy plant to grow, propagating freely from cuttings in an ordinary propagating-bed, or they may be put in pots of half light loam and sand and stood in a warm shady corner of the greenhouse. Although usually recommended the treatment accorded tropical plants, they will grow well out-of-doors in summer, and will bloom quite freely in December in a greenhouse of intermediate temperature.

Streptosolon Jamesoni is another plant which by careful training can be grown into a handsome standard. It grows rapidly when young, and training must begin as soon as the plant is a few inches high, since it branches freely and would soon be out of hand for training purposes. At Mr. H. H. Hunnewell's place at Wellesley there is now a beautiful specimen in bloom, with a clear stem of about four feet, and above this an unevenly globular head of the same diameter. Some branches are longer than others, and some drooping, with just enough variation in length to offset an otherwise formally trimmed appearance. The flowers are borne in loose terminal corymbs at the ends of the branches; they are narrowly campanulate, with an irregularly rotate limb of brilliant orange-color. A second crop of flowers follows closely on the first, from laterals developed while the first crop is open, and with a little trimming away of dead flowers the plant remains fairly effective during the remainder of the winter. The best results are obtained by continuous pot-culture. Those we have

planted out have grown too rampantly, and have been with difficulty established in pots when taken up in the autumn.

All who have seen *Richardia Elliottiana* are captivated by its beauty. In habit it more nearly resembles *R. albo-maculata*, and in the manner of its growth our common *Arisæma*, blooming in early summer and afterward going to rest. It increases very slowly, the bulbs developing eyes only when two or three years old, and these are with difficulty established when removed. It is an expensive plant and likely to remain so until some more successful way can be found of propagating it. A silver medal was awarded Mr. Joseph Tailby, of Wellesley, by the Massachusetts Horticultural Society, before whom he exhibited two years ago. The plant bloomed also about the same time with Mr. Robinson, at Mrs. Ames' gardens, North Easton, Massachusetts. Both plants have borne seed. Examination of the spadix of the common *Calla* shows the male and female flowers distinctly divided. They are apparently so in *R. Elliottiana*, but closer examination shows additional stamens scattered, or masses of anthers, which are apparently sessile among the female flowers, and these are the only ones in which the pollen is ripe at the same time as the stigmas, all the upper staminate part of the spadix having shed its pollen long before, as in the common *Calla*. This would seem to be a natural provision for self-fertilization, and accounts for the fecundity of the species, as the plants which have borne seed must have been self-fertilizing, as only one plant bloomed at one place at a time.

Mr. Tailby has tried pollenization with the "little green" *Calla*, and also with the common *Arisæma*. Seedlings, so far, show only the characters of the female parents. I think it is unlikely that so wide a cross should be productive of any other result.

Wellesley, Mass.

T. D. Hatfield.

Correspondence.

John Brown's Grave.

To the Editor of GARDEN AND FOREST :

Sir,—Every student of American history must be glad to know that on the 10th of January the Adirondack farm which holds the grave of John Brown was transferred to the possession of the state of New York, to be kept in perpetuity as a public park. And every one who has visited the farm itself must rejoice that John Brown chanced to be buried in so beautiful a place. Chance, however, is hardly the right word to employ in this connection. It is well known that John Brown was not born in this place, but chose it as his residence, fixed upon the exact spot for his future grave and transported from Connecticut to this spot the tombstone upon which the names of some of his forefathers were cut.

This now historic farm lies within the limits of the village called North Elba, in Essex County, about three miles from the village of Lake Placid. But while the latter has become a popular summer resort, with several large hotels, North Elba is hardly more than a village in name. It contains only a few houses, and one may easily drive through it without suspecting that he has reached a place which claims a personal identity. Then, to reach the Brown farmhouse one must turn southward from the highway and follow a narrow, winding and somewhat rising road through a thick tract of woodland for the space of, perhaps, half a mile. Suddenly the forest ceases and one emerges upon a wide and beautiful plateau largely surrounded by impenetrable-looking woods, beyond which to the north are glimpses of stately mountains, while toward the south the ground slopes away, affording a more extended panorama of hills and far-off noble peaks.

Had this approach been carefully planned it could not have been more beautiful or more dramatically impressive. Level green areas as large as the one contained by the Brown farm are rare in this elevated part of the mountain country, and rarely are the painful signs of man's forest depredations so wholly shut out from view. It seems like a fertile, hidden oasis in a land where tangled forests alternate with mournful, fire-swept, barren tracts and with little farmsteads which seem almost as unproductive and are almost as ugly. Within this lovely circle of woods all looks luxuriant and complete, and all is absolutely peaceful; and in the centre of it, close to the farmhouse, rises the singular, isolated, large-rounded boulder which John Brown selected as his tombstone.

Nothing is cut upon this boulder, under the shadow of which he now lies, except his name and the date of his death, in plain large letters. Close to it stands the small old stone which he brought from Connecticut. Blossoming Roses and

other shrubs twine about them, and the little plot thus formed is surrounded by a simple rustic paling. There is no attempt at "art" and none at ornamentation, except such as Mother Nature could contribute; therefore the effect of the spot is as beautiful as it is impressive, and it is to be hoped that, now it has become a public possession, nothing will be done to "improve" any part of the farm. It should remain as it is—as John Brown saw it and as his family left it. The cottage should be placed in charge of a guardian, of course, but no gardener should be let loose upon the land; and, I think, if a landscape-artist were asked for his advice he would decide that nothing, or very little indeed, should be done to it.

The farm comprises 244 acres, and in the year 1870 was purchased by a number of public-spirited persons in order that it might be preserved from destruction. Miss Kate Field started the subscription for this purpose, and has since been active in urging the transfer of the place into official keeping. Since 1870 a fund has accumulated from the rental of the house and land; and, the newspapers of the moment assert, this fund is to be used "in the erection of a monument on the farm to John Brown's memory." Had I not read these words I should not have been so strongly prompted to write about the place just here and now. But just here and now it should be very plainly said that no money could be expended in a worse way than in building a monument of any possible kind in the beautiful and characteristic spot which I have tried to describe. Its charm, its individuality, its impressiveness, spring from its purely and simply rural character. To build anything ambitious in such a scene, in the vicinity of John Brown's humble little low-browed wooden house, would be an artistic sin of the deepest dye. There would be no excuse for such an act even if the grave were wholly unmarked. Were this the case, only a stone of small size and of the simplest possible sort should be erected. But John Brown already has a monument which he selected himself, and which, in its simple appropriateness to the character of the site and to the character of the man himself, has a greater beauty, dignity and significance than anything that mortal hands could make. No man in America needs, near the place where his body lies, another monument as little as does John Brown. If there is money lying idle, and if it ought to be used to commemorate his name, let a monument be built, but not on the Adirondack farm; anywhere else, but not within sight of John Brown's grave.

New York City.

M. G. Van Rensselaer.

Our Native Plants in Winter.

To the Editor of GARDEN AND FOREST :

Sir,—The beauty and value of some of our native shrubs, as regards their winter aspects, impressed me more strongly than ever during a stroll along the banks of a stream and through a forest one warm sunny afternoon in last December. The ground was bare, save where it was carpeted with fallen leaves, *Hepaticas* and evergreen Ferns. Here and there stood groups of *Sumach*, *Rhus glabra*, making crimson spots in the landscape. In cultivation this is a desirable shrub, for, though its autumn effects are sufficient to command a place for it in every garden, it is beautiful through the summer also. The smooth glossy leaves show white beneath when upturned in the breeze, and during the latter half of the season its effectiveness is enhanced by the crimson cone-shaped fruit, which is carried late into the winter and long after the leaves have fallen.

The Barberry, too, *Berberis vulgaris*, thrives luxuriantly in New England, where it is now well established as a wild shrub. The abundance of this species growing beside the path, with its bright scarlet berries, frost-bitten, it is true, but still clinging to the spiny branches, lent a certain brightness and cheer to the surrounding landscape which were fairly exhilarating. Along the banks of the stream *Choke Cherry* bushes were covered with dense tangles of *Greenbriar*, *Smilax rotundifolia*. The prickly and vivid green stems were so closely interwoven as to form an impenetrable screen even in winter after the leaves had fallen, and the blue-black berries clustered against it helped, by contrast, to make it ornamental. The Bitter-sweet, *Celastrus scandens*, grew there, too, and of all the native shrubby climbing plants none is more attractive when the orange-colored pods open and disclose the bright scarlet seeds.

We are fortunate in having plants that remain beautiful when vegetation is taking its winter rest, and I wonder why they are left outside in the planting of home-grounds, and foreign shrubs introduced which are less beautiful, and often useful for summer effects only.

Experiment Station, New Haven, Conn.

W. E. Britton.

Meetings of Societies.

Nebraska State Horticultural Society.

THE prevalent financial depression and seasons of drought, instead of discouraging horticultural enterprise, has in Nebraska seemed to quicken it, and the twenty-seventh annual meeting of the State Horticultural Society was more largely attended and enthusiastic than any of its predecessors. The deficiency in rainfall of the last three years, not before equaled in severity for forty years, has served to emphasize the importance of better culture, so that every grower is on the alert to adopt the best possible methods.

IRRIGATION.

Mr. Lute Wilcox, of Colorado, gave a practical talk on methods of irrigation, illustrated by charts, which served to make his statements very clear. To show the importance of his subject he stated that Colorado has \$100,000,000 invested in its irrigation plants. The average grade of irrigation-canals is two feet a mile. Sometimes it falls as low as eighteen inches, and in case there is much silt in the water it may need to be as much as three feet. The ditch-walker carries the key to the public gate and governs the amount of water that each land-owner can have, and laws are very stringent against any attempt to steal it. From one-fourth to one-third of the water is lost by evaporation, so that it is most important to carry the water the least possible distance to the point where it is to be applied. The furrows for distributing the water have a fall of one inch in from 66 to 100 feet. In ordinary work these are not closer than forty feet apart, and in some cases several hundred feet. Grades in the land are overcome by means of check-dams. Water must never be put on land unless there is an opportunity to drain it away; otherwise the land will become over-wet and worthless. The furrow system is the most practical, and is especially adapted to fruit-culture. In orchard work two furrows are generally used between each row of trees, the furrows passing along under the tips of the branches. What is known as a lath-funnel is inserted in the lateral to supply each space between rows. This is made by nailing four laths together so as to leave an opening about one-half by one inch. This supplies the water just about fast enough, so that it requires little or no attention. A slowly running stream well managed does best work, and with a stream of this size the ground will be sufficiently watered in from five to twenty hours. This will not need to be repeated oftener than once in three weeks. Rows for irrigation should not be over 300 feet long. The furrows are made with a one-horse shovel-plow. If water is applied to one side of the tree only it will cause the tree to lean toward that side. To determine whether the land needs water, take up a sample of the soil five or six inches below the surface; if this will ball in the hand no water should be applied. One thousand barrels of water at each application is sufficient for an acre. In young orchards it is sometimes customary to run four furrows between each row of trees instead of two. Cultivation is just as essential as irrigation, and can no more be dispensed with in irrigated than in unirrigated sections. Special tools have been devised for orchard cultivation which will pack the lower layers of soil just as little as possible. The aim is always to get the water to soak four or five feet into the soil. For this reason it is important that the land should be thoroughly subsoiled before planting unless the subsoil is so open as not to require it. Water should never be applied to trees when in bloom. The most important time to irrigate orchards is when the buds are forming for the next year's crop. In eastern Colorado this occurs in August. No further watering is given until just as the trees go into winter quarters, or just before the ground freezes. This year the Colorado people are irrigating in January. Water should never be allowed to come in contact with the trunk of the trees, and for this reason the flooding system is not well adapted to orchard work. The greatest enemy to irrigation is the evaporation caused by the rays of the sun. This entails much additional labor in the matter of cultivation. It requires two men to irrigate and care for fifteen acres of orchard during the season.

Subirrigation is too costly for any ordinary crops, and in orchard work the roots are sure to fill up the tiles. A machine is in use which makes and lays a continuous tile in position beneath the ground at the least possible cost, but even then the cost is \$400 per acre. The equivalent of seven inches in depth over the entire surface of the land is considered a satisfactory amount to apply at one time in Colorado, and three

applications usually suffice for the growing season. The water used in winter is in addition to this. Potato growers, however, are now coming to give nine or ten irrigations. If possible to avoid it, no water is applied until the tubers begin to form, but thereafter it is given every ten days. If is very injurious to let Potatoes stand for two or three weeks and then apply water again, as that induces a second growth.

In the discussion following this paper it was stated that one million acres can be irrigated in Nebraska from canals now under construction, and probably one million acres more from canals proposed. The point was also made that with the greater rainfall and diminished evaporation in Nebraska much less water would be required for the same area than in Colorado.

THE CONSERVATION OF SOIL MOISTURES.

Professor T. L. Lyon, of the State University, said that this is a subject of paramount import west of the Missouri River; it is estimated that fifty per cent. of the rainfall of the eastern states is lost by running away on the surface and by percolation, while in Nebraska only about ten per cent. is lost in the same way. The primary cause of droughts in this region is not insufficient rainfall, but excessive evaporation. Nebraska soil contains a large proportion of silt and comparatively little clay. The finer the particles the closer they will pack, hence the result is that the lower layers of our soil are exceedingly compact. A loose soil will allow water to sink into it much more rapidly, and will also retain this water much better, than a compact soil. From these facts it is easy to see the value of subsoiling as a means of retaining moisture. Its value, however, depends upon the condition of the subsoil. It is beneficial when the subsoil is compact, but may be useless or even injurious when the subsoil is open and sandy. The work should preferably be done in the fall rather than in the spring, in order to retain to the fullest extent whatever moisture falls during the winter and early spring months. Next in importance to subsoiling should be ranked fall plowing, as this accomplishes the same object, though in a less degree. Failing in this the earlier in the spring the work can be done the better. Thorough and frequent cultivation during the summer is most important. The same qualities of soil which make the subsoil compact also make it a good carrier of water by means of capillarity. The layer of loose soil formed by cultivation simply acts as a mulch or blanket to prevent evaporation. This point was illustrated by lighting two lamps, in one of which the wick had been cut apart and a piece of hemp sewed between to break up the capillarity. In this case the blaze quickly died out. For the same reason it is advantageous to plow stubble land as soon as the grain is off. This not only aids in conserving moisture, but the land is then in better condition to plow than later on.

SUNSHINE AND CLOUDINESS IN RELATION TO CROPS.

In a paper on this subject by Professor G. D. Swezey, of the State University; it was stated that May is the cloudiest month in Nebraska and September the clearest. Taking the length of the day into consideration, it is found that the greatest amount of sunshine is found in July, which in turn is followed by August and September respectively. Not very much is known regarding the intensity of sunlight here, but it is known to be greater than in more humid regions. With normal rainfall the conditions for the growth of crops are almost ideal, since the greatest amount of sunshine occurs when the crops are ripening their fruits. The evaporation of this region is excessive, however, and partly by reason of the large amount and greater intensity of the sunlight.

STRAWBERRIES AND IRRIGATION.

This was the subject of a paper by Mr. J. W. Stevenson, who uses windmills with one and a quarter inch pipe laid on the surface of the ground, and finds the results very satisfactory. Pieces of rubber hose prove useful for connecting the pipe. This allows more freedom in laying pipes, and they can be easily taken apart and carried by one man from place to place as required. He thinks the windmill the cheapest power for lifting water, but it is liable to fail in the time when most needed, hence it is desirable to supplement the windmill with steam or horse power if necessary. He finds it a simple matter by means of wires and proper adjustments to attach a windmill to a pump in a well several hundred feet away. He believes heartily in subsoiling, and uses a tree-digger for this purpose, preferring it to the ordinary subsoil-plow. The land should then be thoroughly saturated with water during the fall or winter. When irrigating in warm weather it is necessary to cultivate the following day in order to prevent the ground

from baking. No harm results from the direct application of cold water as pumped from the ground, as he uses no reservoir and applies the water directly as pumped.

The Western New York Horticultural Society.—I.

FOR fifty years fruit-growing has been one of the leading industries of western New York, and the annual sessions of the Horticultural Society at Rochester are largely devoted to orchards, vineyards and small fruits. The long experience of the members of this society and the efficiency of its officers make its gatherings the most important convention of fruit growers held in this country. The meeting of last week was no exception to the general rule. More than five hundred members were registered as present; the exhibition of fruits and of implements designed to facilitate fruit-culture was large and varied, and the addresses, as usual, had a genuine practical value. The large hall was filled at every session, and well-known horticulturists were present from Michigan, Ohio, Connecticut, Maine, Virginia, Canada and the Hudson River Valley. Mr. W. C. Barry was elected president for the next year; Wing R. Smith, of Syracuse, vice-president; S. D. Willard, of Geneva, second vice-president, and John Hall, of Rochester, secretary and treasurer.

THE PRESIDENT'S ADDRESS.

President Barry, in speaking of the increased usefulness of this society, took occasion to commend the professors of agriculture and horticulture in Cornell University and in the experiment stations, who have helped materially not only by their presence, but by carefully prepared papers, to make the sessions of the society profitable. He also acknowledged the debt which the fruit growers of the present owe to the pioneers who founded this society and who had sufficient enterprise to collect different fruit plants from abroad, and by testing different varieties and experimenting in methods of culture had left an invaluable body of experience. The dry weather of the past year, which injured all crops, and especially small fruits, has impressed growers more than ever with the necessity of providing for a permanent water-supply, and it is generally felt that every care must be taken to save the rainfall. Underdraining, deep plowing, hillside reservoirs, wind-power, should all be tried, and every other method of securing that moisture which is absolutely essential to the production of crops. In reference to the marketing of fruit, Mr. Barry considered it a mistake to sell and ship it at the time of gathering. In many cases this is unavoidable, because growers have no place to store their fruits and therefore dispose of them hastily and often unprofitably. Ordinary farm buildings cannot be successfully used. It is advisable on every fruit farm to have a structure, even if a temporary one, which is suited for storing fruits. If these can be held back for a month, or even a fortnight, until the rush to market is over, good prices can usually be realized, and very often the increase in price thus secured will, in one season, nearly or quite pay for the building. This building may be of moderate size at first, and can be enlarged as necessity requires. Well-equipped houses for retarding the ripening of fruits and for cold storage are expensive, both to build and to maintain, but in any section where fruit-growing is carried on largely a company can be formed and a building constructed for common use, but for ordinary cold storage for single farms one can be built at small cost, and when once used it will be considered indispensable.

In regard to the fertilization of orchards, Dr. Van Slyke was quoted to the effect that farm-yard manures need to be supplemented with fertilizers containing phosphoric acid and potash to make a proper food for orchards. With every ton of stable manure it is well to mix from fifty to one hundred pounds of acid phosphate and from twenty to fifty pounds of crude muriate or sulphate of potash. Unleached wood-ashes, ground bone and potash salts are better than stable manure. A peck or half a bushel of ashes to a bearing tree, with three or four pounds of ground bone, is what is needed. Two pounds of potash salts can be substituted for the ashes. When unleached ashes of known purity can be bought at home they are worth buying if they do not cost too much. But all the potash and phosphoric acid they contain can be had much cheaper than by paying \$10.00 a ton for ashes. Muriate of potash and bone meal cost two and a half cents a pound, and 150 pounds of it will furnish as much phosphoric acid as a ton of ashes,

and both together will not cost half as much as ashes ordinarily do. Mineral manures can be handled quickly and at little expense. In short, few people realize how much it costs to distribute such a bulky fertilizer as barn-yard manure. Orchards which have outlived their usefulness should be cut up into firewood and not allowed to occupy valuable ground and breed destructive fungi and insects. In their place new orchards should be planted on ground perfectly prepared and well planted with a proper selection of trees. We have now remedies and preventives which enable us to keep in check insects or diseases which threatened the destruction of orchards and vineyards a few years ago. Spraying has become almost as common as cultivation, and we should test every new help, even to the importation of natural parasites, to help us in our war against insects.

Among the members of the society who have died during the year, and to whom Mr. Barry paid special tribute, were the venerable John J. Thomas, first president of the society, who died in his eighty-fifth year—a modest, capable man and a trusted authority, eminent in the practice and in the literature of the art of horticulture; Charles E. Cook, one of the largest fruit growers in the region of western New York and the inventor of a fruit-gatherer which is widely used; the brothers Moulson, old nurserymen, of Rochester, both of whom had passed their fourscore years; the brothers Thomas and Edwin Smith, of Geneva, who for forty years have been eminent as nurserymen and fruit farmers, and Ethel C. Sherman, who had been for many years secretary of the Horticultural Society of Wyoming County.

THE COST OF A POUND OF GRAPES.

Mr. John W. Spencer, in speaking on this question, said, in part:

The Chautauqua grape belt, in the Lake Erie valley, is about fifty miles long, hemmed in on the south side by a ridge of precipitous hills, and the breadth of the valley available for fruit-culture varies from three to five miles. Through the centre of the valley runs a zone of gravel once the beach of the lake when it discharged into the Mississippi Valley through the gap where Chicago now stands. Between this beach-level and the present shore of the lake there is a belt of clay, and on the hillside a zone of glacial till. The gravelly land was once the highest-priced and bore better crops of grain, the clay was the best grass land and the hillside was a sheep pasture covered with mulleins and briars. At first the gravel was thought the most eligible for grapes, but now vineyards are found on the clay and the glacial drift, on which latter place the grapes are as good in quality and sometimes yield as much in quantity. The cost of the various processes in cultivation, such as cutting the curls, stripping brush from the wires, stretching wires, tying, tillage, etc., from spring up till the time of harvest, is about \$9.00 an acre. How much a nine-pound basket costs depends on the man and his soil. In vineyards where there are no missing vines, and all are thrifty and even, an acre will yield a thousand baskets, and often twelve hundred, but the average grape grower of the region does well if he gets five hundred baskets, and the careless vine dresser gets all he deserves if he has two hundred and fifty. With five hundred baskets to the acre each one will cost one and eight-tenths cents. But this nine dollars which has been expended since early spring does not take the grapes to the freight-car, and, indeed, it pays for only one-quarter of the journey. The cost of baskets, handling, picking, packing, attendance in various ways and hauling is yet to be met, so that harvesting the grapes cost \$27.00 more an acre, making a total of \$36.00. In 1894 grapes were 11¼ cents a basket at the car door, or \$58.75 an acre, which left \$22.75 of profit. Out of this must be taken the taxes, interest, wear of implements, posts, crates and sometimes fertilizers, which, of course, vary in individual instances.

Fruit-growing is every year becoming more and more a profession which combines skill and science, and the man who is best paid is he who raises the most difficult products. Fifty men are competent to produce crops where there is one competent to raise mushrooms, but mushrooms bring fifty times as much a pound as grapes. The exceptionally skilled horticulturist can find a better business than growing grapes. The man who raises five hundred baskets to the acre pays twice as much for cultivating the same product as the man who raises a thousand, but the difference is only \$9.00 an acre. Superior skill only tells in raising a crop. Large yields do not cheapen the cost of harvesting and transporting. Superior fruit does not bring superior prices under coöperative selling, as is done in Chautauqua. The straggling bunches of the careless man are dumped into the same cars with those of the most skilled grow-

era, the car-load is sold as a whole, and the pay is made pro rata according to the number of baskets, so that coöperative shipping has disadvantages as well as advantages, and it is the skilled grower who suffers—that is, he does not reap the full reward of his superior knowledge.

Notes.

Since October 1st, 792,431 barrels of domestic potatoes have been offered in the markets of this city, 296,031 barrels in excess of the supply a year ago. During the past week there were received 30,934 barrels of the home crop, besides small shipments from Europe, Bermuda and the West Indies.

The first Florida strawberries of the season may be had at \$1.00 to \$1.25 for a quart box. The only Tangerine oranges now available are tiny specimens from California, and these cost the excessive sum of \$10.00 a box, wholesale. The few Mandarins offered are from Italy, and thirty-four half-boxes of this fruit from Sorrento, landed on Monday, sold for \$5.50 on the dock.

Another part of the important *Flora of Nebraska*, edited by members of the Botanical Seminary of the University of Nebraska, already noticed in these pages, has been issued. It is part 21 of the whole work, and is devoted to the Rosales, the author being Mr. Axel Rydberg. In this group are treated Rosaceæ, Cæsalpiniaceæ, Mimosaceæ and Papilionaceæ, these three families being formed from the Leguminosæ as limited by Benth, the Saxifragaceæ, Crassulaceæ, Hamamelidaceæ and Grossulariaceæ. The editorial committee of this important work, Professor Charles E. Bessey, Roscoe Pound and F. E. Clements, announce that part 8, devoted to the Fungi Imperfecti, is approaching completion.

Formerly Cuban and domestic cigar boxes were all made from the wood of the Spanish Cedar, a species of West Indian Cedrella, but now the demand for boxes to hold cheap domestic cigars is so great in this country that other woods, stained to resemble Spanish Cedar, are largely used for the purpose. The wood of the Tulip Poplar, Liriodendron, is considered the best of the North American woods for this purpose, although chestnut, butternut, elm, basswood and cottonwood have been tried. Cigar boxes are also now very largely made in the United States with veneers of Spanish Cedar cut in thicknesses of from eighty to one hundred and twenty sheets to one inch and mounted on cheap American woods like cottonwood or basswood.

A report of the importations of bananas into the United States during 1895, issued by Bennett, Walsh & Co., of this city, shows that 186 cargoes of this fruit have been landed. Jamaica furnished more than any other country, 4,108,620 bunches coming from that island. Bocas del Toro, a port of the United States of Colombia, and Bluefields, each sent out more than 2,000,000 bunches, and a like total came from Belize, Livingston and Honduras, and also from Banas and Cabanes, with nearly as many from Port Limon. These, with importations from minor ports, amount to 16,720,127 bunches. Of this grand total 5,088,119 bunches arrived in New Orleans, 4,548,572 in New York; Mobile comes third with 2,449,618, followed by Philadelphia with 2,026,780, Boston 1,637,802, Baltimore with less than a million, and Charleston with only 41,000 bunches.

Well-blanchéd celery from California sells at \$1.10 for a bunch of a dozen stalks; that from Rochester brings \$1.00 a dozen, and, while less white and showy, is considered of higher quality. Small heads of cauliflower from California cost thirty to sixty cents each, and larger heads from France bring seventy-five cents. Brussels sprouts from the latter country sell for twenty-five cents a pound, and artichokes for the same price each. New string beans, beets and egg-plants come from Florida, besides tomatoes. The latter sell for twenty cents a pound, the price, also, of California tomatoes, the hot-house product, bringing thirty-five cents. Peppers, from Cuba, cost forty cents a dozen. Other vegetables now in season in our markets are celeriac, new leeks and onions, Spanish onions, sweet potatoes, Savoy and Danish cabbage, the green Hubbard and yellow squashes. Tender blades of sorrel and dandelion, grown under glass on Long Island, are in considerable demand, and sell, respectively, for fifteen and twenty-five cents a quart.

Currants are grown successfully at the Geneva Experiment Station on a southern slope with soil of rather a heavy clayey loam and a clay subsoil. This is well drained by lines of tiles

two rods apart. The bushes are set four feet apart in the rows, and the rows are from six to seven feet apart. A forkful or two of stable manure is thrown around each bush in autumn and turned under, but not deeply, in spring. The ground is cultivated two or three inches deep near the plants, and rather deeper midway of the rows at the first cultivation, after which, by shallow tillage, the surface is kept stirred and free from weeds until August. In fall the five-year-old canes are cut away with the broken branches with all those that droop to the ground, and all but one or two new shoots of one season's growth. No unvarying rule can be followed in pruning, but it is thought that generally a cane reaches its greatest productiveness during its fourth or fifth season. If a cane still appears vigorous after its fifth year's growth and well filled with buds it is allowed to remain longer. Under this treatment the bushes make enough wood and yield abundantly.

The council of the New Mexico Agricultural Experiment Station has passed a series of resolutions which have been sent to the stations of the different states, relating to the injury done by the introduction of scale and other insects from the West Indies and Central America into the southern states. After setting forth the fact that some of these insects may live over a large portion of this continent, as does the West Indian *Diaspis Amygdali*, which is now attacking Peach-trees as far north as Washington, and that experience in California has proved it possible to prevent by inspection the introduction of many pernicious insects, it is recommended that quarantine officers be appointed by the agricultural experiment stations of the several states, and paid out of the funds of these states, to be stationed at Key West, Mobile, New Orleans, Galveston and other ports, to examine plants introduced, to destroy those found infested and to issue a certificate for those which have been passed. It is also recommended that a skilled entomologist be appointed by the Department of Agriculture to travel in Mexico, Central America and the West Indies, make collections of injurious insects, investigate their habits and transmit his collection, with report, to the National Museum.

A writer in the *Scottish Geographical Magazine*, speaking of Formosa, states that the clearing of the forests of Camphor-trees there is going on at a very rapid rate. Many of the trees are cut up for making camphor; others are sawn into planks and knees for the building of boats. For over thirty years there has been a constant demand for camphor, and yet the Chinese Government has done nothing to prevent the reckless waste of these forests, and has taken no steps for the replanting of the tracts which are useless for cultivation. It is said that in the mountains of the interior Camphor-trees are still abundant, and there is no immediate fear that the supply will run short; but the increased demand for camphor in these days of smokeless powder will hasten the destruction of the trees, and it is therefore to be hoped that under the administration of the Japanese Government, which as a result of the war with China has come into possession of this territory, care will be taken to insure a future supply by planting these waste lands. The trees grow very rapidly and reach a height of forty feet in twenty years, and probably trees which are fifty years old will be large enough for all the ordinary purposes to which the timber is applied. To secure the camphor, distilleries of mud bricks some ten or twelve feet long, six feet wide and four feet high, are built on the hillsides, with five to ten fire-holes a foot apart and the same distance above the ground in each. An earthen pot full of water is placed over each fire-hole, and above it a tube a foot in diameter passes through the structure appearing above it. The tube is capped by a large inverted jar with a packing of damp hemp between the jar and the cylindrical tube, which is filled with chips of wood, about the size of the little finger, resting on the perforated lid covering the jar of water, so that when the steam rises it passes up to the inverted jar or condenser, absorbing the resinous material from the wood on its way. While the distillation is going on an essential oil is produced and is found mixed with the water on the inside of the jar. When the jar is removed the beady drops solidify, and crude camphor, crystallized like newly formed snow, is detached by the hand, placed in baskets lined with Plantain leaves and sent away to the nearest town for sale.

Publisher's Note.

A portion of the issue of GARDEN AND FOREST last week was printed on paper of a different color from that ordinarily used. Subscribers who return such copies will be furnished with others printed on our regular paper.

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Plane Trees.

LONG before Xerxes encircled the Plane-tree of Lycia with a band of gold to mark his admiration for its beauty the peoples of the east venerated these trees for their massive trunks and wide umbrageous crowns of beautiful and cheerful foliage. The Persians, and after them the Greeks, formed their groves and shaded their dwellings with Plane-trees, which were the first shade-trees planted by the inhabitants of the valleys of north-western India. The Romans, who shared with the Greeks their admiration for the Plane-tree, carried it to Europe and planted it in all the southern countries which they overran. This Plane-tree of the east is *Platanus orientalis*, and its native land extends from the Grecian islands and peninsula to Afghanistan and Cashmere. The Oriental Plane is one of the noblest of trees, and fabulous stories are told of the great age, the enormous trunks and the far-spreading branches of some old specimens. Such stories are, perhaps, somewhat exaggerated, although large Plane-trees still exist in eastern Europe. A portrait of one of these old trees, now standing in the court of the Janissaries in the old Seraglio, in Constantinople, was published in our third volume, and gives an idea of the size this tree attains and the massiveness it preserves, even in very old age. The Oriental Plane is still the favorite shade-tree of southern Europe, where for two centuries, at least, it has been planted in the streets and squares of modern cities. It was brought to this country not very long ago, probably, and thrives in all the middle states, where it has proved itself an excellent street-tree; and it supports even the climate of New England.

In the flora of the Old World there is a single member of the genus *Platanus*, or Plane-tree, and North America now contains the others, only four or five in number, although the genus was once more widely distributed and richer in species, and during the tertiary period of the world's existence grew in Greenland and Arctic America, and then spreading southward inhabited central Europe and midcontinental North America, regions where no Plane-trees now occur. The entire absence of these trees from the flora of eastern Asia is an anomaly in plant geography

which is not easy to explain, for tertiary plants of circumpolar distribution which have survived to the present time, like *Platanus*, are generally found in the existing floras of eastern America and eastern Asia, and it is exceptional to find one of these genera represented only in North America and Europe.

There are strong points of resemblance in all the trees of this genus; the structure of their flowers and fruits is practically identical; they all grow to a very large size, with enormous stems covered below with dark scaly bark, and above and on the branches with smooth, thin, light gray or greenish bark separating easily in great thin scales, which, in falling, expose large irregular surfaces of the pale yellow, whitish or greenish inner bark; they all produce the same peculiar leaf-buds enclosed in summer in cavities of the enlarged bases of the leaf-stalks, and their lobed leaves are all of ample size and of the same color and texture; the wood of all the Plane-trees is hard, heavy, light red-brown, and contains broad and very conspicuous medullary rays, which make it attractive as a furniture wood and for the interior finish of houses; and it is only by the shape of the leaves and by the amount and character of the pubescence which clothes their lower surface that the different species can be distinguished.

Of the Plane-trees of the New World three species grow within the territory of the United States and two exclusively in Mexico. Of the Mexican species one is a little-known and rather problematical tree of the south; the other, *Populus Mexicana*, inhabits Nuevo Leon and the states to the south of it. This tree is frequently planted in the plazas of the cities of north-eastern Mexico, and is perhaps the handsomest of all Plane-trees, the under surface of the mature leaves being clothed with a thick coat of snowy-white tomentum which, as they flutter in the wind, makes a beautiful contrast with the dark, rich green of their upper surface. This tree, although it has been long known to botanists, seems to have escaped the attention of the horticulturists of southern Europe, where it may be expected to flourish and become an ornamental tree of the first class.

Of the species of the United States the most widely distributed, the largest and the best-known is *Platanus occidentalis* of the east. Although not the tallest deciduous-leaved tree of the United States, perhaps, it is the most massive of them all, and the largest tree which grows on the continent east of the California Sierra Nevada. On the rich bottom-lands of the basin of the lower Ohio River the Plane-tree sometimes attains the height of one hundred and seventy feet, and forms a trunk ten or eleven feet in diameter above its much-swollen base. Trunks of this size are usually hollow from old age, and such great trees, which were common when the Mississippi Valley was first settled by white men, are now rare; and each year sees their numbers decrease. In the second volume of this journal the portraits of two of these trees growing on the bottoms near the junction of the White River with the Wabash were published, and on page 55 of the present issue will be found that of another tree in the same region made from a photograph for which we are indebted to Dr. Jacob Schneck, of Mount Carmel, Illinois, the centre of the richest and one of the most interesting tree regions of this country.

Platanus occidentalis is one of the common inhabitants of the borders of streams and lakes and of rich bottom-lands, and is distributed from southern Maine to the northern shores of Lake Ontario and to eastern Nebraska, and southward to Florida and western Texas. It is occasionally cultivated in the eastern states and in Europe, although as a planted tree it is much less common than the Old World Plane, which is a more desirable street and park tree here, as our native species suffers more seriously from a fungus which every spring destroys the young leaves in the seaboard states, causing them to turn brown and wither, as if the trees had been scorched by fire. This pest is so serious that the trees are often stunted and deformed

in their efforts to produce new crops of leaves to replace those killed by the fungus, and the planting of the western Plane cannot be recommended. The wood of this tree is now used in very large quantities in the United States in making furniture and in finishing houses. Formerly it was almost the only material used in the manufacture of the boxes made for packing tobacco, but the demand for wood for this purpose has become so great that that of other trees is now often substituted for plane-wood in the manufacture of tobacco cases.

The second of the North American Plane-trees, *Platanus racemosa*, inhabits the banks of streams in California, where it is distributed from the valley of the lower Sacramento River southward through the interior valleys and coast ranges of the state, and finds its most southern home on San Pedro Martir, a high mountain half-way down the peninsula of Lower California, where several other California trees have retained a foothold. It is one of the largest and most beautiful of the deciduous-leaved trees of California, and is very common on river-banks in the neighborhood of the coast from Monterey to San Diego, growing often to the height of more than a hundred feet and forming a trunk eight or nine feet through and sometimes erect and free of branches for half its height, but more often divided near the ground into several secondary stems which are erect or inclining, or often prostrate, for twenty or thirty feet at the base, and then turn upward toward the sky.

The third species of the United States, *Platanus Wrightii*, bears the name of the indefatigable botanical collector, Charles Wright, who discovered it nearly fifty years ago in southern Arizona when he was connected with the survey undertaken to establish the boundary between the United States and Mexico. It inhabits the banks of streams in the cañons of the mountain ranges which stretch along our south-western boundary from the Rio Grande to the Colorado, and, like most of the trees of these mountains, belongs to the flora of northern Mexico rather than to that of the United States. As it appears in the sombre cañons of these sun-baked mountains *Platanus Wrightii*, which frequently attains the height of eighty feet and makes a trunk four or five feet through, is a splendid object, rising high above the Walnuts, Willows and Alders with which it grows, and spreading far its great limbs, clothed in pale sea-green bark. From other Plane-trees it differs in this coloring of the juvenile bark and in the shape of the leaves, which are divided by narrow sinuses, sometimes nearly to the centre, into from three to seven, but usually into five, elongated, acute lobes, and are often deeply cordate by the downward projection of the two lower lobes. The Arizona Plane-tree is the largest deciduous-leaved tree in the mountain forests of the south-west and one of the most distinct and beautiful trees of the genus.

Forest Lands in Massachusetts.

THE town of Washington, Massachusetts, is located at the highest point on the Boston and Albany Railroad. About Washington, as a centre, a large area of land is given up to second-growth timber, and a view from the top of one of the higher summits of the mountain range extending north or south from the railway will disclose a large territory growing up to forests. Last summer I made a carriage-drive over a considerable section of Berkshire County, where this timber-land could be readily seen. Numerous observations were also taken from high points not ordinarily visited. Among these was Becket Mountain, 2,194 feet above the sea-level, from which a view is secured extending from the Catskills on the west to the Holyoke range on the east.

A person unfamiliar with this region would be surprised at the amount of land now occupied by growing timber. Leaving out of consideration the immediate vicinity of the towns, and a few rural homes about Lenox and Stockbridge, clearings are the exceptions, and not the rule. Driving east or south from Lee extensive forest tracts are

found. The country is rapidly becoming reforested. These lands have a very low valuation. During the past year Pittsfield and New York parties have been purchasing extensively in Washington, so that already it is claimed that one syndicate controls some 5,000 or more acres, for which four dollars an acre have been paid. This land, it is understood, is to be fenced, and, rumor has it, will be kept as a game preserve. The people occupying this region, so far as I have been able to learn, have no faith in the future prospects of the forests as a source of revenue. Hardwood, delivered, brings three dollars a cord in the local market, and this price hardly pays the hauling over poor roads. The supply of saw-logs is quite limited; tan bark is comparatively scarce, and the railroads get their ties cheaper elsewhere. The country is now rapidly growing up to forests more extensively than ever in recent years.

Nevertheless, I believe that the timber resources of these New England hills will have a significant value in the future. The sources of timber-supply of the country are becoming more and more restricted. Michigan, Minnesota and Wisconsin no longer have extensive areas of timber. The big timber-fields adjacent to the good shipping points are becoming scarce. In Massachusetts and New England are many small forests twenty to thirty years old that are producing promising crops of timber for the future. Within ten or twenty years they will begin to yield a revenue from timber-supply, without taking cordwood into account, and such lands as these ought to be safe investments for the farmer and for the future.

And this suggests a field for investigation for the agricultural colleges in the several New England states. As an example, would it not be desirable and appropriate for the Massachusetts Agricultural College to secure a block of, say, one hundred or more acres of cheap land in second-growth timber, and use it as a permanent field for systematic forestry? Many problems of a practical nature could here be investigated that cannot be considered on the high-priced land where the college stands. Here could be maintained a summer school of forestry, where, for two or three months, students might repair to study under conditions at present unavailable in New England, if not in the United States. The summer school is now accomplishing work in many directions, but the first summer school in forestry is yet to be created.

A block of such timber-land might be made a great source of instruction and benefit to the farmers of Massachusetts, and the practicability of timber-culture in the state could have a fair trial. The farmer needs to be educated as to the possibilities of these rough hills for forest purposes. He has neither the time nor the money nor the training which would enable him to make these investigations for himself, and the state can well afford to help him and set the example if this will encourage the study and practice of scientific forestry by the people.

In the mean time the timber reserves of the state are growing, and some day their value as a source of income will become manifest.

Lafayette, Ind.

C. S. Plumb.

Foreign Correspondence.

London Letter.

NEW ORCHIDS.—The productions of the hybridist are the only noteworthy recent additions to garden Orchids, and there are only few of these that call for special mention. *Cypripedium* Miss M. Ames, a hybrid between *C. Curtisii* and *C. concolor*, raised by Messrs. F. Sander & Co., is remarkable in form and in the yellowish green wax-like flowers tinged with rose. The pouch is pinched laterally, as in *C. concolor*. Another Sanderian hybrid, named Said Lloyd, raised from *C. Godefroyæ* and *C. venustum*, has yellow and pale brown flowers, heavily blotched with chocolate-brown; is sufficiently distinct to find favor with

collectors of hybrid *Cypripediums*. Another hybrid addition to this genus is a cross between *C. callosum* and *C. Druryi*, raised at St. Albans and named A. R. Smith. It has large yellow and dull brown flowers, which are not as attractive as the characters of the parents would lead one to expect. *Oncidium Wheatleyanum*, although not new, is a rare plant in English collections. It was shown in flower this week by Sir Trevor Lawrence. I should call it a form of *O. varicosum*, with a large blotch of red-brown at the base of the deeply lobed labellum.

DENDROBIUM JOHNSONÆ.—A well-flowered example of this Australian Dendrobe was among the plants exhibited at the Drill Hall this week by Messrs. F. Sander & Co. It is a distinct species, but disappointing horticulturally, the segments of the flowers being too narrow and the pose of the inflorescence wanting that grace and fullness which characterize the pick of the Australian members of this genus. The flowers are smaller than those shown in published figures of this species.

VANDA CHARLESWORTHII.—Baron Schroeder exhibited a plant of this rare Vanda last Tuesday. It is supposed to be a natural hybrid between *V. cœrulea* and *V. Bensoni*, and was described by Mr. Rolfe in *The Orchid Review* last year, page 323. The flowers are two and a half inches across, nearly white, veined and marbled with rose-purple, the sepals and petals resembling those of *V. cœrulea* in texture and form, while the lip is like that of *V. Bensoni*. The leaves are narrower than those of *V. cœrulea* and the scapes are erect, the plant exhibited having two scapes, with an aggregate of seven flowers.

CYPRIPEDIUM MASTERSIANUM.—This hitherto rare species was imported probably from Borneo to Kew nearly twenty years ago, and was described by Reichenbach in 1879 from materials supplied by Messrs. Veitch & Sons, and named in compliment to Dr. Masters, F.R.S., the distinguished editor of *The Gardeners' Chronicle*. It has broad leaves about a foot long, deep green with paler tessellations, and erect scapes fifteen inches high, each bearing a large flower, probably the largest in the genus. The dorsal sepal is orbicular, bright green, with a broad margin of white and a fringed edge; the petals are horizontal, spatulate, nearly two inches long, dull red, with black-purple warts near the base and along the upper margin; the pouch is very large and inflated and is colored reddish brown, shaded with green and spotted with purple. Messrs. Sander & Co. have succeeded in rediscovering and importing a large quantity of plants of this species and offered 5,000 plants of it for sale by auction recently. The plants were in excellent condition and realized fair prices.

PRIMULA SINENSIS.—A special feature of the last meeting of the Royal Horticultural Society was a large collection of the forms of *Primula Sinensis*, exhibited by Messrs. H. Cannell & Sons, Swanley, who have long held a foremost place among the trade growers and breeders of this useful winter-flowering greenhouse plant. Seven large houses are filled with it in all its best forms, about ten thousand plants being grown annually for seeds. The best white variety is one called White Perfection, which has short-stalked large heads of flowers, each one and a half inches across, conspicuously imbricated, the segments wavy and crisp-edged. Equally beautiful and large in flower is a carmine-pink variety called Cannell's Pink. These two varieties come true from seed and are very floriferous. They have, however, one fault, from a purely decorative point of view, a fault common to nearly all the improved strains of this *Primula*—namely, the flower-stalks are too short, and, consequently, the plants have a squat, stubby look even at their best. Messrs. Cannell are, however, alive to this defect, and for several years now they have aimed at producing a race with looser, taller trusses. They have made considerable progress in this direction, their *Pyramidalis* strain, bred from a loose, tall-stalked variety known as White Lady, crossed with the short-stalked, large-flowered forms, being a decided improvement. Twenty years ago long-stalked *Primulas* were discarded as weedy

and lacking finish, but Messrs. Cannell were fortunate in securing this White Lady variety, which had been kept for years in the famous garden of Sir George Macleay, at Pendell Court, and with its aid they are rectifying the mistakes, or, at any rate, are going back to strains ignored or repudiated by recent breeders. These fine varieties come true from seeds, a remarkable fact, but one about which there can be no question. A new variety called Cannell's Gem, with rich carnation-pink flowers, of which a few plants in flower were shown by Messrs. Cannell, is certain to be popular on account of its color. It has yet to be tested as a seed-bearer, as sometimes a beautiful variety is practically barren when fertilized with its own pollen. Swanley Blue is a deep mauve-flowered variety, which is the nearest approach to a true blue Chinese Primrose so far produced.

London.

W. Watson.

Cultural Department.

Hybridizing Nymphæas.

IT is generally supposed that Nymphæas are difficult to hybridize, an opinion based on the numerous failures to cross some of the species. Most of these attempts, however, have been made with species which are not closely related to each other; for instance, the pollen of *N. cœrulea* has been tried on flowers of *N. odorata* or *N. alba*, and pollen of *N. Devoniensis* or *N. rubra* on some white-flowering hardy kind. It is difficult to imagine a cross between the species mentioned above, because their habits of growth are so widely different.

For several years I have experimented in hybridizing some of the kinds with satisfactory results, but my successes have been scored when the seed parent and pollen parent were closely related. To show how easily Nymphæas are hybridized one has only to take a plant of the white-flowered *N. gracilis* and flower it in company with any of the Zanzibar section. The result will be that, without any other interference than that effected by the wasp-like insects which infest the blooms, it is next to impossible to get seed that will come true. The seedlings will show foliage almost similar to that of *N. gracilis*, but the flowers will be either light or dark purple, instead of white, and in shape pretty nearly intermediate between the Zanzibar varieties and *N. gracilis*. Again, if the true dark purple-flowered *N. Zanzibarensis* be isolated from the lighter-flowered form called *azurea* and from all others related to it, many of the seedlings raised from it will have flowers every bit as deep in color as those of the parent, whereas if seedlings be raised from a plant which has grown in company with its lighter-flowered forms those seedlings will have flowers of an intermediate color.

In the night-blooming section all the kinds are easily crossed, and any one having the facilities, who will spend a half hour or so over a bloom, can have hybrids of his own raising. Take, for instance, the well-known Nymphæa Lotus, which, so far as my experience has shown, sets and ripens more seed than any other of the night-bloomers, unless it be its variety *dentata*. As the seed parent I prefer *N. Lotus* to *N. dentata*, as its flowers are of such a graceful outline. When crossed with *N. Sturtevantii*, for example, they preserve the cup-shaped form and make a splendid bloom. The ideal cross between these two well-known kinds is seen in the hybrid which has been named *Smithiana*. In form the flower partly resembles each parent, being larger than that of *N. Lotus*, the seed parent, and a trifle smaller than that of *N. Sturtevantii*. The color is not intermediate between them, however, but is a delicate blush.

I have never been able to gather seed from *N. Sturtevantii*, although I have watched it every season since it was sent out. The pollen grains from its flowers are efficacious enough on other flowers. *N. Smithiana*, too, has not set any seed so far. The first season's flowers of this hybrid were rather disappointing, being quite small; this was partly due to a great profusion of growths from the little tuber which was set out along with the plant. All of this section, by the way, ought to be planted without tubers, as they are then more apt to concentrate their energy in one crown and produce very much larger flowers.

The large white-flowered Nymphæa *dentata* sets seed every time when properly fertilized with pollen from *N. Devoniensis* or *N. rubra*. Every intervening shade between the white and deep red may be obtained, such as is seen in the hybrids

named O'Mahana, delicatissima and Deaniana. The hybrid with very dark flowers named Columbiana is a puzzle to me, as it is a cross between the kind with very dark-colored leaves which goes under the name of *N. rubra* and *N. dentata*, the first named being the seed parent. One would suppose that a hybrid between these two well-known kinds would have flowers of a light red or pink color, but the flowers of Columbiana are darker than either of the forms of *N. rubra* or *N. Devonensis*. Another peculiarity which the plant possesses is that the flowers are much smaller than those of either of the parents.

In order to make sure of success in hybridizing *Nymphæas* one or two little details should never be neglected. The first thing to do is to make ready for each flower a wire screen in the shape of a hood, the mesh to be small enough to keep out the smallest insects; this screen ought to be large enough to completely envelop the flower when it is fully expanded; it should be attached on one side to a stout stick, and merely placed over the flower by thrusting the end of the stick into the soil in which the plant is growing, taking care that the bottom of the screen is beneath the water, but before this is necessary the flower which is selected for seeding must be prepared carefully, and this is the most important part of the work. Begin just before the flowers expand in the evening, select a flower which is about to open for the first time, open the petals gently and remove every vestige of the stamens; this can be done perfectly with the thumb and forefinger. At this period of the flower's existence the pollen is unripe and there is not the least possibility of any of it getting on to the rayed stigma of the flower. After the operation is completed place the hood over the flower and let it remain till next morning. At the same time another hood should be placed over the flower selected as the pollen parent, taking care that it also is about to open for the first time; this will remove any possibility of insects visiting it and mixing pollen from other flowers with its own. Now, during the forenoon of the next day, just before the Lilies are about to close, examine the pollen-bearing flower, and if, as is likely to be the case, the pollen is ripe, shake it over the one from which the stamens were removed, and, as a further means of insuring success, nip off a few of the stamens and place them in the centre of the impregnated flower; next draw three or four of the inner petals together by their tips and join them by a pin, replace the hood, and if the flower sets any seeds at all it is reasonably certain that they cannot produce anything else than hybrid seedlings.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Orchid Notes.

CALANTHE VEITCHII is one of our most useful winter-flowering Orchids, and even small collections should not be without this showy plant. For the past month it has made a good show of flowers here, and they will last for several weeks yet. Our plants are grown in five-inch pots, with one pseudo-bulb in each pot. As the plants are without leaves when they blossom, we find it easier to arrange them when they are in small pots among other foliage plants, which make a good groundwork for them. There are three dozen plants in bloom now; they have flower-spikes a yard or more long. When the plants have finished flowering water is entirely withheld, and they are kept on a dry shelf which is near the glass roof, where they get an abundance of light, so as to harden and mature the pseudo-bulbs better. The repotting is done in March, when the young growth is about an inch long and just as the young roots start to grow. The plants are turned out of the pots and all the exhausted soil removed from the roots. The dead roots are cut back to within an inch of the pseudo-bulb, and this short piece of root which is left helps to keep the plants in place until they make new roots. Good drainage is very essential, and the pots are almost half-filled with broken crocks. Over the drainage is placed a layer of fern-root to prevent any clogging. When potting the plants the pots are filled up moderately firm to within an inch of the top. The plant is then placed on the top of the soil, and about half an inch more of compost is added, so as just to cover the base of the bulb. If the plants are not perfectly firm then they are tied to a small stake, which keeps them in position until the roots take hold of the new compost. A place where they get plenty of light suits them best after they are potted, and they are, therefore, placed on a shelf near the glass in the stove. After potting they need very little water for several weeks. If too much moisture is given at this stage the young growth turns black. When the plants have made good roots and fairly sized leaves they need an abundance of water. About July, the

young bulbs begin to form, when weak liquid-manure can be given twice a week until the pseudo-bulbs begin to lose their leaves and the flowers begin to open. When the plants are in bloom they only need enough water to keep the flowers in good condition.

This beautiful hybrid was raised by Mr. Dominy at Veitch's Exeter nursery in 1856. It was obtained by crossing *Calanthe rosea*, then known as *Limatodes rosea*, with the pollen of *Calanthe vestita*. It flowered for the first time in 1859. The pseudo-bulbs are flask-shaped, six or seven inches long, and the leaves are large, plaited and light green in color. The long graceful spikes have rich, bright rose-colored, white-throated flowers two inches across.

Calanthe vestita is a handsome species that has been cultivated for nearly half a century. Although it is not quite as showy as the above hybrid, it is well worth growing and makes a good display at this season. It has roundish pseudo-bulbs with broadly lanceolate acuminate leaves, which are about a foot and a half long. The flowers are produced in long nodding hairy spikes. They are milky white, with a yellow blotch on the lip in front of the column, and they measure about two inches across. This Orchid was first discovered by Dr. Wallich, an Indian botanist, in 1826, but was not introduced to cultivation until 1848. Then it was collected in Moulmein by Dr. Kane and sent to England.

Calanthe vestita rubro oculata is a handsome free-flowering variety also in bloom. It has large delicate white flowers with a blotch of rich crimson in the centre.

Dendrobium Linawianum is a mass of handsome flowers. It has upright, deeply furrowed stems, which are a foot or more high and are swollen at the internodes. The young stems have oblong, obtuse leaves, which are about three inches long. The very beautiful flowers are produced in pairs from the joints on the two-year-old stems. The flowers measure more than two inches across, and the sepals and petals are oblong, acute, white at the base, and are of a rosy purple color in the upper half. The lip is ovate, reflexed, being of a bright crimson-purple and has a crimson spot on each side of the disk. This plant is grown in a basket, and when it requires rebasketing it is done in spring after it has flowered. It thrives in a mixture of fern root, sphagnum and lumps of charcoal. During the summer months it is grown in the stove, hung up near the roof, where it gets plenty of light, heat and moisture. When it has finished its growth for the season, which is about September, it is removed to a cooler house, where it gets plenty of light and air, so as to ripen its pseudo-bulbs. It needs very little water during the early part of winter, when it is resting, just enough to keep it from shriveling. When it shows flowers it is taken into a warmer greenhouse, where it is watered carefully until all the flowers are developed. They last in good condition for about three weeks.

The sweet-scented *Dendrobium aureum* is also flowering now. Although it is not quite as showy as some other species of this genus, it is quite distinct and useful. Its flowers are produced in twos or threes from the nodes of the two-year-old stems. They measure about two inches across, the sepals and petals being a cream color. The lip is large and reflexed, velvety above, buff-yellow, streaked with dull red, and the column is orange-red. The flowers, before they perish, change their color to a deep golden yellow. During spring and summer the plant is grown in a hot, moist house, and in the fall it is removed to a cooler one. In winter it is kept dry and hung in a place where it can get all the sunlight it needs. It grows best in baskets in a mixture of fern-root and sphagnum. This *Dendrobium* is East Indian, and is said to have a wider distribution than any other species of this genus. It has been collected in eastern Assam, on the Khasia Hills, in Nepal, the Madras Presidency, southern province of Ceylon, in Moulmein and in the Philippine Islands.

Dendrobium Ainsworthii is a beautiful hybrid between *D. aureum* and *D. nobile*. It was raised in the collection of the late Dr. Ainsworth, Manchester, England, and flowered for the first time in 1874. It makes a useful winter-flowering plant, and its fragrant flowers are very pleasing now. They are produced on the mature pseudo-bulbs and measure more than two inches across. The sepals and petals are white, with a slight tinge of rose. The lip is white, with a large central blotch of an amaranth color.

Another hybrid with the same parents as the above, but raised by Veitch, of Chelsea, is *D. splendidissimum*, which is also in bloom. The flowers of this hybrid are larger than those of the preceding, and more glossy. The sepals and petals are white and tipped with rosy mauve. The lip is white with a slight touch of yellow in it, and a rich deep purple blotch in the centre.

Botanic Garden, Harvard University.

R. Cameron.

Forcing Hybrid Perpetual Roses.

ONE of the most important points in selecting hybrid Perpetual Roses for forcing is to procure such plants as are budded well down on the stock; plants budded high invariably become exhausted much sooner than those budded lower, when subjected to the trying ordeal of forcing year after year. The time to introduce the plants into heat must be regulated with reference to the time the flowers are wanted; about fourteen weeks is generally required from start to finish. It is necessary that the plants be first subjected to a thorough freezing to insure their breaking away freely. Pruning is also important, and in no case should the young shoots be left too long, about three good eyes being sufficient.



Fig. 6.—The Western Plane, *Platanus occidentalis*.—See page 51.

A night temperature of forty-five degrees will be quite sufficient for the plants at first, increasing to fifty degrees as growth advances and until the buds are well formed. After this time sixty degrees will do them no harm so long as the atmosphere of the house is not kept too dry. The first growth is probably the most critical in the whole process, as during that time there is greatest danger from stagnation. If water is applied too freely before the plants have had time to produce fresh roots the result will be a sickly stunted growth in place of the desired strong, vigorous break. We find light syringing twice daily and the maintenance of a moist atmosphere all that is required for the first three or four weeks. When the plants

are growing freely, and especially after the flower-buds are set, frequent applications of liquid-manure will be found helpful, and the odor from the manure will assist in keeping down red spider and help to darken and strengthen the foliage. After blooming, repotting or top-dressing should be seen to, according to the requirements, and the same careful treatment continued, every encouragement being given to the plants until the growths have been matured. They may then be hardened off gradually, and toward the beginning of June they should be placed out-of-doors, the pots being plunged to the rims in ashes. The most suitable forcing varieties are Ulrich Brunner, Paul Neron, Magna Charta, Baroness Rothschild and Earl of Dufferin. The last two varieties are somewhat subject to mildew, and should be placed in the warmest end of the house.

Tarrytown, N. Y.

William Scott.

Carnation Notes.

THE propagation of cuttings for plants for next winter can be begun now. We have already inserted cuttings of one or two slender growers like Lizzie McGowan, as it is well to start these early to have strong plants in the fall. Our main batch of Carnation cuttings will be inserted during February, although we find that such easily propagated kinds as Daybreak, William Scott and Tidal Wave make sufficiently large plants if not put in until March. If the sand in the propagating bench has been already used for other cuttings it should be removed and fresh material supplied, with which more satisfactory results will be obtained. At the bottom of our bench we put a layer of clinkers and coarse cinders; over this is placed a layer of sphagnum moss, and some three inches of sharp sand is ample for all propagating purposes. This should be pressed down firmly and watered with a rose can before the cuttings are inserted. From four to five weeks generally elapse before the young plants are ready to box off, and with careful attention at least ninety per cent. of the cuttings should take root. The percentage lessens somewhat later in the season. We find a bottom-heat of about sixty degrees about right. Care must be taken not to allow cuttings to wilt before being put in the bench, and to protect them from the sun's rays until rooted. Neglect of these simple precautions is the cause of many failures. Too much stress cannot be laid on taking cuttings from the strongest and healthiest plants, those produced on the flower-stems being the best. If plants are weak or diseased it is far better to buy stock from a reliable florist who makes a specialty of Carnations than to run the risk of perpetuating disease, with consequent disappointment.

We have recently boxed off our cuttings rooted for outdoor summer-blooming, and we keep them on a shelf close to the glass. In about six weeks these will be potted off singly into three-inch pots, or a size larger if the plants are extra-strong. In this latitude it is risky to plant out until the middle of May. By that time, with judicious topping and careful attention, the stock will be of good size. Only a

limited number of sorts flower satisfactorily out-of-doors. Mrs. Fisher is still the best all-round variety, and with us is a mass of bloom and buds from July to November. Other kinds which have proved a success are William Scott, F. Mangold, Daybreak and one or two unnamed scarlet seedlings.

If plants on the benches have not yet been cleaned it is well to get this work done before the spring rush commences. That the plants yield better returns after being cleaned any one can testify who has tried it, yet many growers continue to leave the diseased, decaying and dead leaves on their plants the season through. Such foliage on Violets, Roses or Chrysanthemums is more noticeable than on Carnations, but the health

of the plants demands its removal from all these. Cleaning Carnations takes considerable time, but it can be done when other work is not pressing, and its benefits will be seen as the flowering season progresses. Where rust has obtained a foothold too much vigilance cannot be exercised. Every affected leaf should be picked off and the plants dusted with lime. Some growers think its spread is checked, but we are still awaiting a cure for it here. I think that keeping the plants picked clean, having proper atmospheric conditions, and paying attention to temperature and ventilation does as much to check the disease as any remedy I have seen tried. A number of prominent Carnation growers advertise their stock as being absolutely free from rust, and I believe there are men in the trade who do their utmost to send out perfectly clean plants, yet for the last year or two novelties have been sent out at high prices after being well boomed, which have turned out to be rusted beyond redemption. It is both an injury to the sender out and the buyer to place such stock on the market. Introducers of new varieties should state explicitly whether or not their introductions have taken disease or not, and no kind should be sent out, however good, if not clean. The American Carnation Society, at its forthcoming exhibition in New York, which promises to eclipse anything of the kind ever held, requires that plants must be shown as well as cut flowers of all novelties entered for certificates. This is a move in the right direction, and the inspection of the stock once or twice during the season by a committee of competent judges is better still. This will have the effect to lessen the number of novelties put on the market yearly and to improve their quality.

At this time of the year burst calyces and slender flower-stems, consequent on sunless weather, are very common, and clear, bright weather and freer ventilation are needed to check these defects. The benches now require rather more frequent waterings, and slightly stronger stimulants are given. With heavy firing red spider is apt to get a foothold on the plants which the heat from the hot-water pipes strikes most strongly. Syringing with a good pressure on bright mornings is the best preventive. We give our plants a night temperature as near fifty degrees as possible, with a drop to forty-five degrees on very cold nights. The top ventilators are opened a little each day when the temperature has risen over sixty degrees. Disbudding is now practiced by most florists and gardeners, and the larger blooms and stouter stems are proofs of its merits.

The interest of prominent Carnation growers is at present centred on the New York show and convention, and a number of promising novelties which will be staged there. It will be interesting to note how last year's seedlings—a number of which were certificated—appear this year. Among whites Storm King was one of the most admired last year at Boston. In this locality it does not appear to be much of a success and compares unfavorably with Alaska, which is good almost everywhere and proves itself to be the finest novelty of last season's introduction. It has a better stem than Lizzie McGowan and a better formed flower, and is likely to lead the latter popular variety by another season. Bride of Erlescourt has been thrown out nearly everywhere, being badly diseased. Bridesmaid, which some growers claim is a serious rival to William Scott, will never, I think, attain half the popularity of the last-named sort. It has not averaged more than one flower to the plant up to this time, and other growers near-by report the same thing. Rose Queen blooms more freely than Bridesmaid, but is of a less pleasing color; it has a good stem, but the calyx bursts badly and the plants take rust. Peachblow is too flimsy for a market flower. Della Fox, similar in color to the well-known Daybreak, will be largely grown about Boston another year. Those qualified to speak predict well for Myers & Santman's seedling. Maud Dean, one of Mr. John N. May's varieties, is also likely to be in considerable demand next spring. Daybreak has a sprawling habit of growth, and a novelty as free blooming, identical in color, and like William Scott in habit, would, no doubt, supersede it. Among dark pink shades Tidal Wave is still hard to beat when well grown. Lena Saling, a little paler in color, to be sent out this spring, and another of Mr. May's certificated kinds, is a promising sort. Meteor, sent out by Mr. C. W. Ward, although it has not proved nearly so floriferous as F. Mangold, is now yielding us a few very handsome flowers of a rich crimson-scarlet color. The plant is a clean and vigorous grower. There is a good opening for a new scarlet Carnation, as no kind now grown is altogether satisfactory. Hector is still the best we have here. With a stem like Mr. Hill's Jubilee, it would be an ideal scarlet. Portia, Emily Pierson and E. G. Hill all lack size. The Stuart is not useful in this locality; it has a grand stem, but the flower comes streaky, and it is only semi-double. Eldorado, yellow,

raised by Mr. Shelmire, looks very well with Mr. Nicholson, of Framingham, Massachusetts. It has a large, well-formed flower, but rather weak stem. Among variegated sorts the contest seems to lie between Helen Keller and Minnie Cook. Those who are growing both seem to prefer Mr. Chitty's variety. Helen Keller is fine when grown as Mr. Edwin Lonsdale grows it. A few plants we have are doing well this year, but most of the florists say a large proportion of flowers fade before opening, and there are few perfect ones.

Taunton, Mass.

W. N. Craig.

Correspondence.

California Oranges and the Frost.

To the Editor of GARDEN AND FOREST:

Sir,—The exaggerated and conflicting reports which have gone east in reference to the freeze of December 29-30 in southern California are partly explained by the fact that only recently has the full extent of the damage done become apparent. Growers, dealers and newspaper correspondents are naturally unwilling to make definite statements until sufficient time has elapsed for the full effects of the frost to show both upon the trees and the fruit.

It is now apparent that the Riverside crop is practically ruined. Riverside is the oldest orange-growing section in southern California, and the largest producer. Her crop this year was estimated at 3,400 carloads, out of a total of 10,000 for the state. The estimates of the loss have been placed at from 50 to 90 per cent. It is unquestionably much nearer the latter figure than the former, and the frost was so general that probably not fifty carloads of absolutely uninjured fruit could be picked from that now remaining on the trees. Much of it has fallen to the ground as a result of rain. Some of the young orchards are apparently dead, and the leaves are falling from the trees in many of the older ones. The proportion of trees actually killed will be very small, but in many orchards the trees have been so badly injured that the yield for a year or two will be greatly decreased.

Next to Riverside, Ontario and Pomona suffered most. In these districts the young trees are somewhat injured, and frost which would produce such a visible effect upon the trees must have frozen many of the oranges. But probably not more than fifteen per cent. of the oranges in these localities have been injured, and this would amount to only a few score carloads. None of the trees have been killed, and the damage will not materially affect their production another year.

Allowing for the fruit shipped east before the frost, which was something over 400 carloads, and the highest reasonable estimate of the frozen fruit, there are still left in southern California from 5,000 to 6,000 carloads of oranges which are uninjured, and which include a large proportion of the very finest fruit. It may be difficult for the eastern man to understand how orchards within a few miles of those frozen escaped entirely, and I will state some facts about topography and climatic conditions which may help to explain it.

The orange-growing sections of southern California lie principally in a series of valleys extending from Los Angeles seventy miles eastward to Redlands. These valleys vary in width from two miles to twenty. They are bounded on the north, south and east by mountain ranges. They are traversed on the north by the Santa Fé Railroad, and on the south by the Southern Pacific. It is up-grade all the way from Los Angeles to Redlands, the most easterly town, 1,300 feet above the sea. The only other orange-growing sections are Orange County, immediately south of Los Angeles, and portions of San Diego County, a hundred and fifty miles still farther south. The relative importance of these sections may be seen from the following estimate of their respective crops for this year: Los Angeles County, 3,750 carloads; Riverside, 3,400; San Bernardino, 1,700; Orange, 800; San Diego, 180.

Frost in southern California always depends upon purely local conditions; it is never the edge of a cold wave from the north, as was the case in Florida a year ago. The mountains and deserts to the north and east prevent this. It occurs usually during the longest nights of the year, and is a result of the rapid cooling of the earth after sundown and rapid radiation of the earth's heat through a rarified atmosphere. This cooling process begins soon after nightfall and continues until sunrise, the cold growing greater as the night advances, and being greatest just before sunrise. There is greater liability to frost in dry seasons than in wet, because radiation is more rapid through a dry atmosphere than through one which is charged with moisture. Low-lying lands suffer most, because the coldest currents of air settle closest to the ground, while

the warmer currents linger longest on the higher slopes, and also because the lower lands do not receive the rays of the morning sun as quickly as the higher altitudes. This item of the sunrise is an important one where the frost is a constantly increasing factor for destruction through the night, and where the amount of damage is largely dependent upon the length of time that the cold endures. Trees and fruit which would perhaps withstand cold for three hours would be ruined should the same degree of cold continue for six or eight hours.

These facts were fully illustrated in the recent freeze. This season has been very dry. Only a slender thread of snow rests on the highest mountains, where usually their slopes are covered halfway to their bases. The total rainfall up to the night of the frost had been less than two inches. The air was dry and heavily charged with electricity, and the frost occurred at a time when the days had been for weeks unseasonably warm. The frost was preceded by a high, dry wind, which swept the air of every particle of moisture. This wind died away before night. The cold set in soon after night-fall, and continued until sunrise. The lowest point reached by the thermometer, at Riverside, was 17 degrees; the lowest at Redlands, fourteen miles distant, but on higher ground, was 26 degrees. This difference of eight or nine degrees made the difference between the destruction of the crop at Riverside and its escape uninjured at Redlands. Most of the other sections of San Bernardino County which grow oranges are, like Redlands, on high ground, being the warm, sunny slopes of the foothills. They escaped, except in a very few of the lowest and most exposed localities, in which there was damage, so slight, however, as to be practically of no importance whatever. In Los Angeles and Orange Counties there was frost, but not enough to injure the oranges to any great extent. These sections are nearer the coast, and the air is not so dry as in the interior. The location of Pomona is in the middle of a wide plain, and is therefore more like that of Riverside than some of the other localities, and the district suffered accordingly. The United States weather observer at Los Angeles had the following to say about the frost at Pomona in his report for January 7th: "The temperature, December 30th last, at sunrise, ranged from 23 to 27 degrees, which was no doubt correct, as the flowers and vegetation showed the fact. There were but few oranges or lemons injured by the frost; many orchards suffered none at all, and the tender growth of lemon trees and lemon blossoms were untouched. Very young citrus trees were damaged in some places, but old trees none worthy of note." This report was, perhaps, as accurate as could be made at the time, but later observations have shown that the damage was greater than at first estimated. It will be noted that the temperature was lower than at Redlands, though higher than at Riverside.

Admitting that the crop of Riverside County is practically destroyed, we still have nearly all the crop of Los Angeles County, or, approximately, 3,000 car-loads. The crops of Orange and San Diego Counties, originally about 1,000 car-loads, have not been hurt by the frost; but the bulk of these are grown near the coast, and are not as fine as those grown in the interior. They are frequently infested with scale, and have to be washed. They are much more acid than the interior orange, and lack the rich, burnished color which the hot winds from the desert give the latter. They are also much slower in ripening, and for this reason most of the crop is still upon the trees in these localities. In San Diego County some oranges are grown in the sheltered valleys back from the coast, and are of excellent quality, but the coast-grown product is a sour fruit, of a light, almost lemon, color, and full of "rag." However, the whole product of this county, 180 carloads, is too small to be of much importance at present. In San Bernardino County there are about 1,000 carloads left, nearly all of which are the very choicest fruit that California produces. The original estimate of the best portion of this county was: Highlands, 200 carloads; Redlands and Crafton, 700, and Colton Terrace, 100. Of these about 350 cars have gone forward, most of it as early fruit, at a high price. There was no damage whatever in these districts by frost. This makes about 5,000 carloads of fruit left unharmed. Much of the fruit still upon the trees at Riverside will be sold, and the amount will be anywhere from 300 to 1,000 carloads.

The early shipments of oranges were, in the opinion of many, a blunder. The best of the fruit was immature, and could not possibly give the consumer a favorable notion of the California orange. The action of growers and shippers after the freeze was still more injudicious, if not actually dishonest. A demand was made upon all the outside districts for packers, and frozen oranges were rushed out of Riverside

at the rate of fifty carloads a day. A few shipments were also made from Pomona. False and contradictory reports were sent out through the associated press and other agencies, which confused the eastern buyer. It is also alleged that frozen oranges were packed under the brands of localities where no damage had been done. The Southern California Fruit Exchange, which was organized ostensibly to protect the growers, did its share toward demoralizing the market by injudicious shipments. This hasty and ill-advised action is to be regretted, as it has caused a loss of reputation greater, perhaps, in the end, than the million dollars or more actually lost in the value of frozen fruit.

The fruit most badly frozen is now upon the ground, abandoned as worthless. One packer at Riverside threw away, last Thursday, twelve carloads, for which he had paid \$7,000. The loss will come heavily upon some of the packers who had bought early, and took their chances of a frost. Badly frozen oranges rot and fall to the ground after a few days, especially if there is rain. Fruit that is frost-bitten, but not frozen, will remain upon the tree. The juices evaporate through the skin, and the pulp becomes dry and tasteless. Sometimes the flavor is injured, although there is no apparent change in the appearance of the orange. The remainder of the fruit forwarded from Riverside this year will doubtless be open to suspicions of these undesirable changes, but this will be only a small proportion of the total still remaining for shipment.

It is absurd to compare this partial disaster with the destruction of the Florida orange groves a year ago. Riverside has about 7,000 acres of bearing groves, and if all of them had been destroyed, instead of the possible five or ten per cent. that have been destroyed and the twenty or thirty per cent. that have been injured, the loss would have been balanced by the new groves coming into bearing in other localities.

There has been heavy loss at Riverside three years during the past six, and the frost of this year seems to indicate that the location has not justified the heavy plantings made there. Experience now shows that the higher lands are best adapted to citrus culture. It also shows that California is only upon the northern edge of the true citrus belt. The sheltered, sunny, foothill lands have never lost a crop through frost, but to come within six or eight degrees of loss every year is not a pleasant experience for the grower who anticipates a return of from \$300 to \$600 an acre from his orchard. If the market recovers, as it should, from the demoralizing effects of the frost, the best groves will pay very handsomely this year, and will be as good a hard-times investment as any one could wish.

Redlands, Calif.

Wm. M. Tisdale.

Notes from Southern California.

To the Editor of GARDEN AND FOREST:

Sir,—Mr. Watson's remarks upon the Cherimoyer (page 14) lead me to say that this fruit is successfully grown here in some localities. Along the foothills on the northern side of the beautiful Cahuenga valley, near Los Angeles, quite a number of trees have been planted. From the garden of Mr. Jacob Miller I have had specimens quite four inches in diameter. A more delicious fruit I have never tasted. In flavor I would compare it to a combination of the pineapple and the strawberry. The flesh of those produced here is creamy white. It ripens here during March, April and May, and good specimens retail at twenty cents each. In this same garden (Mr. Miller's) are growing a number of uncommon trees and plants. A Coffee-bush, some eight feet high, produces annually a profusion of fragrant flowers and ripe berries. A good-sized Carob-tree bears pods regularly. There is also a grand specimen of *Plumieria alba* (Frangipani), four or five feet high and as much in diameter, which blooms abundantly during late summer and autumn, filling the garden with fragrance.

The belated rains have at last arrived, and the landscape is fast assuming the greenness of spring-time. The farmers are now shipping from this favored locality green peas, string beans, tomatoes and ripe strawberries, and in the water garden *Aponogeton distachyon* is flowering freely.

Los Angeles, Calif.

Edmund D. Sturtevant.

Irrigation in Horticulture.

To the Editor of GARDEN AND FOREST:

Sir,—In your report of the meeting of our Horticultural Association at West Chester, Pennsylvania, on irrigation, I am reported as saying that we paid eighteen cents for a hundred gallons of water; the figures should have been fifteen cents for a thousand gallons. When I said that a one-inch pipe with eighty pounds pressure will irrigate a quarter of an acre, I

meant that such a pipe running a day would answer for one application. As the subject of irrigation has become of unusual interest, permit me to add some of our experience. We have used water to a considerable extent for two seasons past, and are satisfied that it pays on some crops even when bought by the gallon. The past summer we used not less than 125,000 gallons on Potatoes, Cabbage, Cauliflower, Celery, Horseradish, Sweet Corn and Strawberries.

The first consideration is not only will it help the crops, but will it justify the expense, and when we pay for water by the gallon the expense rises as rapidly as the water flows from the pipe. Where the water can be pumped or collected by damming a stream, the increased use does not increase the cost, and if the first cost is not too high irrigation would be profitable in very many cases. There are few summers without one dry spell at least, and when this is not too long it will pay to irrigate many crops even at the price we are paying, but in a continuous drought, such as that of the past season, the expense will be too great, except, perhaps, on a few fancy crops, such as Strawberries, Celery and Cauliflower.

Subirrigation is the best method for field crops, but for market gardening a full supply of water is needed on most crops. Crops that require only a short season cannot wait long for rain and then reach perfection.

Marietta, Pa.

H. M. Engle.

Meetings of Societies.

Nebraska State Horticultural Society.—II.

HORTICULTURE IN EASTERN NEBRASKA.

A CAREFUL discussion of the comparative advantages of fruit-growing here and in other sections was presented by E. T. Hartley. Mr. Hartley has given special attention to the advantages of the Colorado fruit-growing sections during the past season, and has come to the conclusion that the prospects of eastern Nebraska are as good as those of Colorado. There is a great deal of booming in the matter of fruit-growing as well as in other lines. We are inclined to make too much of our successes and too little of our failures, to report the returns from exceptional trees, unusual prices, etc. Reaction is the inevitable result of such a course. He has no desire to ignore the disadvantages of Nebraska, but believes that when both advantages and disadvantages are carefully compared we shall find a balance in our favor. Nebraska has seen forty years of prosperity, and it is unlikely that its whole character will now change. It is only a matter of common observation that other states have seen similar periods of depression from time to time. Moreover, orchardists have suffered less than other classes during this time. While Corn has in countless instances failed to produce any crop whatever, orchards which have been well cared for have given fair, and in some cases heavy, returns. It is also a significant fact that while corn is now selling at fifteen or sixteen cents a bushel, apples are bringing from \$2.50 to \$3.00 per barrel at wholesale. When we consider carefully the cost of drainage, the disadvantage of working among stumps and stones, the cost of irrigation, the backward civilization and other disadvantages which must be encountered in the different sections of the country, we see that our own location is not so unfavorable after all. There are many drawbacks to irrigation—first, the cost of the water-right and fees, then the increased cost of cultivation, together with numerous annoyances that an outsider never dreams of. Mr. Wilcox stated that it requires two men to irrigate and care for ten acres of orchard, while in Mr. Hartley's orchard two men and one team will care for one hundred acres. He can cultivate the whole of his orchard while the men who use irrigation are plowing out the furrows to apply the water. Then these furrows must be gone over with a hoe to correct irregularities, remove clods, etc., and this may take more time than to make the furrows in the first place. The short rows which irrigation demands increase the cost of cultivation materially. Even if a crop can be secured every year by means of irrigation, it is not likely to prove as profitable as the same amount of labor applied to more land, but with a crop only every other year. Transportation is just as important as production. In this matter the Colorado growers work under a very serious disadvantage. In fact, Mr. Hartley presented figures, gathered on the ground, which seem to show that after the crop is all grown and ripe upon the tree at Grand Junction it then costs over two dollars a barrel to gather, pack, ship and market it in Denver or Pueblo. Mr. Hartley found that at Grand Junction he must pay twenty cents a dozen for peaches grown there, while in Denver the same peaches were selling at two dozen for fifteen cents. This year has demonstrated the ability to

produce fruit in eastern Nebraska in spite of drought. Moreover, with the small fruits, which yield a large return from a small amount of ground, it is possible to profitably lift water by means of windmills to help out the rainfall. This cannot prove profitable for ordinary farm crops, for there is too little margin in the possible product of an acre. The loss of water by seepage and evaporation is too great also, even if reservoirs are employed, to make the undertaking feasible, except for those crops in which the market value is high. Hard winds, cold waves and frosts have been much more injurious than drought even during these recent dry years. Many orchards have proved an unexpected blessing to their owners during these trying years.

E. M. Pollard, of Nehawka, gave results of work and statistics to show that orcharding in Nebraska had proved a profitable venture with them thus far. They make a specialty of apples and cider. The cider is heated to about 150 degrees, Fahrenheit, by steam and run into heated barrels while still hot. By this means the cider is kept sweet, provided only that the package is completely air-tight. They also employ vinegar generators, by which they can secure first-class vinegar from fermented cider in thirty-six hours. They find it very difficult to compete against the cheaper corn vinegar, which is nearly everywhere sold as cider vinegar. From the best statistics which he could get he finds that the average price to the grower of apples in Nebraska during the last seven years has ranged from \$1.50 to \$3.00 per barrel. They now set eighty trees to the acre, but with only forty trees to the acre, at an average price of fifty cents per bushel, the returns would be twice as great as can be realized from corn, even if the yield should be but one bushel a tree, while it ought to be five bushels. He deprecates the continued planting of the Ben Davis Apple. In the better family trade, which they aim to supply, he finds it difficult to dispose of this variety, and in their newer plantings it is discarded altogether. Many of the Apples of good quality which succeed in the east fail here, but the Swaar does well.

ARE THE BIRDS FRIENDS OF THE HORTICULTURIST?

This was the question discussed by Professor Bruner, of the State University, and he made a strong plea for these feathered inhabitants of our fields and gardens. Seventy-five per cent. of the food of birds consists of insects. Moreover, when we consider their ability to withstand cold and their powers of endurance, it is apparent that they must require much fuel to maintain the bodily functions, and consequently must be hard eaters. There are fifty more species of birds found in Nebraska than are reported from any other state except Texas. There are undoubtedly more than 75,000,000 birds in Nebraska for half the year. These, upon the most conservative estimate, destroy thousands of bushels of insects. The winter birds subsist largely upon weed seeds, thus causing marked depreciation in the spread of these nuisances. Numerous figures were quoted showing the contents found in the stomachs of different birds when examined for that purpose. The quail is one of the best friends of the farmer and horticulturist, for it destroys millions of chinch bugs. The flicker also eats chinch bugs. Professor Bruner believes that the unusual destruction of fruits caused by birds within the past few years has been primarily owing to their lack of water. Upon this point, however, many of the growers did not agree with him.

The Western New York Horticultural Society.—II.

THE INVISIBLE FRIENDS AND FOES OF THE FARMER.

ON this subject Professor Roberts said: The soil teems with invisible plants or low vegetable organisms which prepare it for higher growths by making available the combined nitrogen in the soil. These invisible plants need a certain amount of air, moisture and warmth for development and growth. They are ever at work breaking down the crude material and transforming it into plant-food, and the fruit grower, like other cultivators, must learn that, like higher vegetables, these flourish best when their home is warm, mellow, dark and moist. Since there are from three to six thousand pounds of potential nitrogen in the first foot of an acre of fairly fertile soil the advantage of multiplying these nitrifying organisms is apparent. The cultivation of the soil unlocks this vast storehouse of food and puts it into circulation. Proper cultivation not only promotes the process of nitrification, but it makes available phosphoric acid and potash, so that these considerations point to a short rotation, frequent plowing, partial soiling and the use of leguminous plants whose roots gather free nitrogen from the air. The objects of cultivation are primarily and chiefly not to make the soil porous

so that the roots of plants can enter it easily, but to promote the invisible vegetable growth and chemical action of the soil which, while holding on to the water as minutely divided, will allow flowing water to pass downward into the subsoil. Water is nature's universal carrier, and it transports all nutrients into and out of the circulation of vegetables in growth. It not only lifts up tons of solid matter through the stems and trunks of trees and smaller plants, but it breaks rock and levels hills and transports them to the sea. Nearly all the moisture used by plants is brought to them by the silent forces of capillarity, and if the soil is in proper physical condition moisture flows upward to the roots of vegetation from the reservoirs in the subsoil as certainly as it runs downward by gravitation.

This is the underlying principle of successful husbandry—an ample reservoir for stored moisture to tide plants over critical periods held by capillarity in well-prepared soils which contain no free water. Under-drainage and deep tillage furnishes this reservoir, and two or three inches of surface soil tilled until it is loose, light and porous prevents the water from evaporating and passing off into the air, so that it is retained in the soil where it must be drawn up through the roots of the plants.

MISTAKES IN ARRANGING HOME GROUNDS.

In speaking of this subject, Mr. W. W. Parce, of Rochester, mentioned the disposition to plant something or to build something everywhere—fences and hedges where none were needed, flower-beds and fountains or a statue to occupy the centre of a lawn which should be open turf. Another error is the mania for making grounds look artificial, formal terracing where nature's way would answer better, rows of trees and shrubs instead of natural groups, trees and shrubs trimmed into unnatural shapes. In many grounds, such trees as Kilmarnock Willows, White Birches, variegated Altheas, Purple-leaved Plums, Irish Junipers and Smoke-trees and a few other trees of singular form, made up the collection, with a Geranium bed, and one of Coleus, and a dozen Rose bushes, each of a different shape. If a man were to dress himself in articles of such staring contrast he would be arrested. In this locality most of the trees and shrubs are deciduous, and there are none with variegated foliage except for a week or two in the autumn. This suggests the use of similar plants in natural grouping, and although it is not desirable to turn a dooryard into a primitive wildwood state, it is true that those places which are treated in what is known as a natural manner are most attractive. Highly colored plants and flowers should be kept out of the foreground, where peaceful scenery and restful forms are needed. To produce these quiet, homelike effects, groups and single specimens of trees and shrubs which are not of such pronounced types as to catch the eye by their peculiarities, should be used, for of these last we will grow weary on long acquaintance.

EVAPORATED FRUITS IN WAYNE COUNTY.

Mr. B. J. Case regretted that large quantities of cheap and worthless apples, half-ripe, badly pared, not thoroughly cured, and treated with too much brimstone were sent out as evaporated apples. This year dealers have returned load after load when they have not been up to standard. Fruit like this can be delivered at the station for from five to seven cents a pound, but it is not fit to eat. In 1893 heavy storms blew down thousands of apples that were hardly fit to feed to hogs, and these were all evaporated. Fifty car-loads of this stuff were marketed in Wayne County. It is no wonder, therefore, that good apples were cheap in 1894 and that they did not bring good prices in 1895. When consumers have received this unpalatable and unwholesome product once they refuse apples the next time. We can learn much from fruit growers in California in this matter, where everything is done neatly and only ripe fruit is used. To hold our market we must keep a uniform product, pare more cleanly and dry more thoroughly, so that the product will keep. They are learning, however, in Wayne County, and first-rate evaporated apples are now sure to bring good prices, and so are first-rate raspberries, of which a million pounds are produced in this county. Berries are stored by packing in a dry barrel and kept in a cold place. Apples, to hold their color, must be packed in boxes and put in cold storage by the first of May. A load of apples well dried in 1891 and put in storage in February, 1892, is now as good as it ever was. Good work is done by evaporating apparatus of all grades and sizes, but the upright-flue system seems the most thorough, and the hot kiln the cheapest. There are no apples evaporated in this state which will grade "fancy" in Boston. Some will in New York and Chicago. One-sixth of the Wayne County product will grade "fancy" in Boston, and five-eighths "prime." Of the prime there are two grades—

one dried on wood and the other on wire. On account of the German law prohibiting the importation of wire-dried fruit, wood-dried apples bring a higher price when Germany is buying freely.

THE EXPERIMENT STATIONS AND FRUIT-GROWING.

On this subject Mr. W. D. Barns said, in part, that the prime work of the stations should be scientific—that is, they should investigate principles, but they should also make practical tests in matters which involve too much expense for the individual fruit grower. For example, they should try different methods of irrigation and ascertain what kinds of fruits are most benefited by it. Of course, we must look to the stations to find whether the San José scale and other insects are liable to be a continuous and growing pest here, and, if so, how they are to be suppressed. The stations, too, might well try to find some substance which will stick to a glossy surface so that it can be used as a vehicle for fungicides and insecticides. But, however good the stations' work, the growers will get no benefit from it unless they read the station literature. It should, therefore, be the duty of every one to interest his neighbors to send their names to be put on the mailing list. At every institute names should be gathered not only of farmers, but of the special lines in which they are interested, so that each one will receive just the literature that he needs.

American Forestry Association.

THE characteristic feature of the annual session of the American Forestry Association at Washington, last week, was the hearty coöperation of several leading public men, especially of the chairmen of the Public Lands Committees of the Senate and of House of Representatives, the ex-chairman of the House Public Lands Committee, and now leader of the minority, and the Secretary of Agriculture. Secretary Morton presided at a largely attended evening meeting, which was addressed by Senator Dubois and Representatives Lacey and McRae. The Secretary has long been known as an enthusiastic advocate of rational forest management, and his opening remarks pointed out from a statistical point of view the folly of depleting our forest resource and the evil consequences to agriculture. It was to be expected, however, that the founder of Arbor Day, which is Mr. Morton's distinction, would enter heartily into a movement for the preservation of the national forest domain, but more notable and significant were the emphatic utterances of Senator Dubois, in whose state of Idaho much of the best of public timber-lands remain, which are looked upon by the people as their rightful property, to be used at will. Mr. Dubois displayed a familiarity with the forest conditions of his state hardly to be expected from one who had not made the subject a special study. He explained the causes of the failure of the timber agents to protect the forests on the public domain, and expressed his earnest hope for the early passage of some such comprehensive legislation as is proposed in the bill introduced by Senator Teller (S. 914).

Congressman Lacey discussed in a delightful way the destruction and repair of our natural resources, and the audience was fascinated by his wit and his poetic pictures of the rich woods and running brooks, once so abundant, and now rapidly disappearing. As a means of repairing our natural forest resources he considered Government action indispensable. He argued that the Government alone can hold tracts either long enough or large enough to effect the great climatic purposes involved in the preservation of the forest cover. The laws providing for timber reservations were a great step in this direction, but it was also necessary to provide for their use. A thorough system of cutting this timber rationally ought to be provided under which the wants of the people might be satisfied. But this should be done with such system as to preserve them as a whole.

Congressman McRae, who was chairman of the Public Lands Committee in the last House, and is a member of the committee at present, spoke of the proposed legislation for an administration of the forest reservations. H. R. 119, which, being reintroduced by him with the same number, goes by the name of the McRae bill, although not ideally the best, contains such features of administration as it would be possible to get passed at present, when improvements might be made afterward from time to time. This bill was actually passed both in the Senate and the House of the last Congress, but failed by unavoidable accident to go to conference committee and to become a law. He expressed the belief that at the present session its passage might be effected.

The Forestry Association is to be congratulated on having secured from three legislators of such prominence emphatic

expressions of sympathy with their purposes, and the country at large will join in the hope that their expectations of successful legislation may be realized during the present session.

From the report of the Executive Committee it was learned that the membership of the association had rapidly grown to over 600, and it now feels strong enough to support a regular monthly or bimonthly publication, and steps to establish such a publication are presently to be taken by the Executive Committee as well as to secure an affiliation with the various state organizations.

Notes.

According to official statistics the importations of lemons into the United States during the past ten years amount to \$38,500,680.

In the February bulletin of the well-known Thayer Fruit Farms, it is stated that after the land is put into high cultivation the actual cost of bringing an acre of Blackberries or Raspberries, well set and with no missing hills, to a good bearing age, is from \$125 to \$150.

Fruits are usually considered luxuries, but Mr. G. C. Snow, of Penn Yan, New York, presented many analyses to the horticultural meeting at Rochester to show that at present prices more heat-producing and life-sustaining power could be bought for the same money in the shape of fruits than of most other articles of diet.

Professor Massey sends us a photograph of some flowering plants of the Chinese Narcissus from bulbs grown in water. The specimens are very well grown and seem to dispose of the objection that bulbs grown in North Carolina will not flower in water. Professor Massey writes that he has Dutch Hyacinths in bloom under glass, Trumpet Narcissi and Frezias, from home-grown bulbs, which are quite as good as any imported ones.

In a recent lecture, Professor Goodale stated that one who wishes to see the showy plants of the tropics at their best ought not to go to the jungle or forest where they are widely scattered and in many instances crowded out of proportion and not in the best health. Under the care of an intelligent gardener all their caprices are humored and they thrive better than they do where they have to shift for themselves. In a stove like that of Mr. Hunnewell, at Wellesley, Massachusetts, and in similar places, where the treasures of the torrid zone are gathered together from the entire circuit of the globe, these plants have a brilliancy of bloom and a perfection of form which are rarely seen in their natural abode.

Oranges have been in light demand for several weeks past, due to the unsound condition of the last of the Jamaica crop and to the injury by frost to the California fruit. Valencia oranges have been selling at a loss recently, but a cargo which arrived in sound condition early last week realized satisfactory prices, and sold for \$4.00 to \$4.62 a box in wholesale lots. On Saturday, however, practically as good oranges from Spain brought only \$1.50 a box. Lemons, too, are selling at low prices, Messina, Palermo and Malaga furnishing the main supplies. Bananas share in this depressed condition, and the highest grade of fruit from Port Limon commands but \$1 15 a bunch at wholesale, while smaller bunches sell for forty cents each.

Mr. Smith Hawley, of Luddington, Michigan, in a lecture before the Horticultural Society of that state, said that the picture so often seen in agricultural papers of a man standing on a wagon and throwing spray into Apple-trees as he was drawn along is a delusion. To do thorough work one must go all about a tree and throw spray upon it from every direction. When this work is properly done the trees will retain their foliage until the snow falls; it will be bright, healthy and in good working order long after unsprayed trees are bare. As a result, trees will produce much fruit on off-years, and the fruit, because properly ripened, will keep better than that grown on trees weakened by the attacks of fungi and insects.

A class of advanced students who are fitting themselves to be professional horticulturists meet once a week at the residence of Professor Bailey, in Ithaca, New York, for the purpose of an informal discussion of current horticultural topics or matters of history and criticism. There are about a dozen of these students, who are most of them Bachelors of Arts or Bachelors of Science, graduated from different agricultural colleges or universities, and they together constitute a class of mature and trained men such as probably have never before been brought together in this country for the express study of higher horticulture. The topic last week was The Lindleys—

their times and work. Other topics have been The Downings; Jethro Tull and the Tillage of Land; The Commanding Factors in New York Pomology.

The recent subscription of \$10,000 to the endowment of the New York Botanical Garden by Mrs. Esther Hermann increases the fund to \$260,000, besides \$5,000 worth of plants contributed by Mr. James A. Pitcher. Some 250 species of trees and shrubs, besides those already in Bronx Park, where the Garden is to be located, have now been placed in a temporary nursery, and the construction of roads and erection of buildings may be begun during the present season. The Finance Committee of the Board of Managers will be glad to receive subscriptions from any one who wishes to follow Mrs. Hermann's generous example. All persons intending to contribute can communicate with Mr. James A. Scrymser, chairman of the Finance Committee, 107 East Twenty-first Street, or with Mr. J. Pierpont Morgan, Treasurer, 23 Wall Street, New York. Inquiries as to the scope and progress of the enterprise will be answered by the Secretary, Professor N. L. Britton, 41 East Forty-ninth Street, this city.

The St. Louis *Lumberman* says that there is no wood which equals the Cypress in value, of which so large a proportion of the total supply still standing is put into market every year. The president of the association predicts that in ten years there will be but seven mills cutting Cypress in Louisiana, in twenty years but four, and in twenty-five years none. This means that within ten years from sixty to seventy-five per cent. of the Cypress will be cut and sold, and that probably half of all the Cypress now standing will have been marketed before the end of the century, and yet the production is now only about two billion feet, say, one-thirtieth that of White Pine, the wood with which it mainly competes. Cypress belongs to the finer class of woods, and it certainly seems short-sighted to sell it for less money than it must soon be worth. It is not abundant, nor is it rapidly reproduced, and it is practically certain that when the present supply is used up that will be the last of cypress lumber as a commercial product.

Mr. Rydberg prints in the third volume of the *Contributions from the United States National Herbarium* an interesting paper on the flora of the sand-hills of Nebraska, a region extending from the ninety-eighth to the one hundred and third degree of west longitude and from the Niobrara River on the north to the North Platte River on the south-west. This is a region of shifting surface and of sandy soil, which is carried away by the wind when it is not held down by the roots of plants or otherwise protected. Some attempts at agriculture have been made in this region, but a farmer, after breaking his field, may find it transformed into a deep hollow and its soil deposited miles away, perhaps, in a great drift which serves as the foundation for one of the hills which are the characteristic feature of the region. Probably once covered by a forest of Pines, the only trees of the region now are Willows and Poplars, confined to the river-bottoms, the largest part of its flora being composed of grasses, sedges and low leguminous plants. A Thistle, the *Cnicus Hookerianus* variety, of Gray, is elevated by Mr. Rydberg to specific rank as *Carduus Plattensis*, a plate accompanying his description.

In a bulletin issued by the Chemical Division of the Experiment Station of Minnesota on the composition, digestibility and food value of potatoes, a cross-section of a tuber is given, in which the relative amount of water and other compounds is graphically illustrated. Three-fourths of the potato is water. One-fifth of it is starch, with limited quantities of fat, fibre, ash, malic acid and pectose or jellies. Only two and a half per cent. of protein occurs, and only about half of this is digestible. It is noted that early varieties of potatoes contain less starch and a larger proportion of protein, because the protein or nitrogenous compounds are formed in the early part of the growth of the tuber, while the starch is added at a later stage. For starch-making the medium-sized and later varieties are preferable, but in excessively large potatoes the jellies and other substances replace the starch. A large part of the limited quantity of albumen in potatoes is often lost in cooking; since when they are placed in cold water to boil much of this material will be extracted while the water is warming up, and, therefore, most of the vegetable albumen is lost. If the tubers are placed directly in boiling water the albumen is coagulated and retained. Peeled potatoes, when placed in cold water and boiled, lose four-fifths of their albumen. Potatoes not peeled, and started in hot water, lose only one-fiftieth. This means that when a bushel of potatoes are improperly boiled as much protein is lost as is contained in two pounds of beefsteak.

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A German View of the Value of the Forest.

WE recently attempted to answer in a general way the question, "What is Forestry?" To give some idea of the importance of this science to the people at large we now quote some passages from an address delivered by Dr. Franz Baur, in November last, on the occasion of his inauguration as Rector of the Ludwig-Maximilian University in Munich.

This address was a discussion of the peculiar place held by the forest in national life, or, as Dr. Baur expressed it, "in the housekeeping of a nation." In the course of it he showed that forest preservation has not only a strictly economical, but also a social-political and ethical side. "At the time," he said, "of the despotic rule of Napoleon I., near the beginning of this century, Germany lay economically exhausted, and through the pressure of necessity the axe was used more vigorously against German forests than in normal times. It was then that E. M. Arndt, who loved his fatherland above all else, exclaimed, 'Now, in many lands, the axe which is laid against the tree is laid against the people itself.' Evidently, in using these words, he thought less of a decrease in the revenues from the forests than of a lasting injury to the character of the German people through persistent forest destruction. And, in a similar spirit, W. von Riehl wrote these significant words: 'Hew down the forests and you will ruin our historic burgher society. By destroying the contrast between field and forest you will take from the German people its principle of life. Man does not live by bread alone. Even if we should need wood no more, we should need the woods. Even if we should no longer require the dried products of the forest to warm our bodies, we should still require the living forest to warm our souls.' The truth of these words grows ever clearer with the rapid development of our industrial life. Already in our great factory towns there live millions of people who exhaust themselves during the week in crowded, and often unwholesome, workrooms, and on Sundays and holidays seek indispensable recuperation for mind and body in the fresh green forest."

This, according to Dr. Baur, is one peculiarity of the forest among the economical treasures of a nation—the fact that it has a spiritual, an ethical, as well as a purely

economical, importance. And from this he deduces the truth that the management of public forests should not be regarded in a narrowly business-like way, as a mere matter of present capital and present interest. The forests of a nation should be looked upon as a great national trust. They should be so controlled that, while the present generation is enabled to draw from them as large a revenue as possible, at least as large and varied a revenue should be secured to future generations. "The dissatisfied directors of our forest finances," he adds, "who always consider the present profit they yield too small, would be in better spirits if they more clearly realized this radical peculiarity of the forestry question." It is true that forests may be made to yield a satisfactory revenue, but since they mature slowly, instead of giving an annual crop, like wheat or barley, they cannot, like many other sources of national wealth, be regarded solely from the money-making standpoint, and, still less, can they lend themselves to the modern wish to secure immediate returns upon invested capital, and to meet, with speculative rapidity, the changing needs and tastes of a community.

After briefly surveying the past history of European forests, during the long periods when no official care was taken of them, and during the more recent periods when a right realization of what this care ought to be, in extent and in kind, he explained that there are still European countries, like Spain and Denmark, where the need for scientific forestry is not yet appreciated; and of the United States he said: "Even in the primeval forests of North America, once believed to be inexhaustible, irreparable damage has already been wrought. Eager for quick profits, the great lumber syndicates of that continent still continue the work of destruction; yet, even there, the necessity for some thought for the future has been recognized, and millions of acres have been set apart as forest reservations—that is, even in this comparatively new country, it has come to be a recognized fact, as it is in the Old World, that if the wounds inflicted on the forest through lack of forethought are to be healed, the cure must be worked by the state rather than by rich private landholders. Even the popular assemblies of most of the German states are no longer willing that their forests should be at the mercy of private interests."

Dr. Baur adds, that in addition to lumber, fuel and other staple products, the forests produce vast quantities of berries, fruits, flowers, mushrooms, mosses, basket-material and materials for decoration, the value of which cannot be accurately computed, although it certainly amounts to millions of marks annually, and hundreds of poor families in Germany, who would otherwise be destitute, depend upon these products for a livelihood.

The unique value, however, of forest-lands as sources of refreshment, enjoyment and inspiration for the souls of men is something which should always be insisted on. If one imagines Heidelberg, for instance, denuded of its forests, or Baden-Baden or Carlsbad, one can understand the importance of forest surroundings to an urban community. Nor are economic interests ignored even when this point of view is taken. Were these cities denuded of their forest environment the multitudes of travelers who now frequent them and bring gold to the hands of their inhabitants would conspicuously diminish.

No government, says Dr. Baur, in conclusion, can administer a forest as it may administer a factory, where it writes over the door, "No admittance except upon business." To do this would be to destroy the value of the forests as a possession of the people. Their portals must be thrown wide open, not only to the architect, the painter, the musician and the poet, not only to the scientific student and the seeker after health, but to the public at large. And in this country one needs to add, the public at large as well as the government must be taught to realize that, while the forests should be utilized by all they should be injured by none, for they are the property, not of this generation only, but of generations yet to be born.

A Botanical Journey in Texas.—I.

DURING the month of May copious and almost continuous rains fell throughout most of Texas, and from Louisiana to Mexico all farm crops were growing luxuriantly and all nature was rejoicing, when, on the second day of June, I started to make a long and tortuous botanical trip from San Antonio to El Paso, a distance of over six hundred miles. Western Texas was at its best, the trees and plants dressed in full holiday attire, with new shoots longer and more drooping than they are in drier seasons, leaves greener, flowers larger and handsomer.

Lovers of nature must have noticed the beauty of all forest scenery in the full growing time of the trees, when the varying tints of green in the newer leaves mingle with the deeper hue of those that are fully developed, and no such lover would soon tire of contemplating a grove of Yellow Locust in June and after a drenching rain has washed their leaves.

Botanizing from the windows of swiftly moving railway cars is too careless observation for the purposes of science, except in regard to well-known and conspicuous species, which, of course, may be recognized. As far west as San Antonio occurs the French Mulberry (*Callicarpa*), the Box-Elder, which will be found at intervals as far as the mountain cañons of central New Mexico and southern Colorado, and the Honey Locust which about San Antonio is either native or naturalized. Wild China or Soap-berry, *Sapindus*, in full blossom, is common in woods throughout our entire journey.

After we cross Medina River the ripe crimson fruit of *Rhus microphylla* renders that shrub conspicuous and adds variety and beauty to the forest scenery. Travelers who have been over this route in times of long-continued droughts are now surprised to see in the clearing of every ranchman and small farmer luxuriant fields of rank tall Corn and other grains growing in a region which they had thought to be only a dreary waste. A stop for a day at Sabinal gave me an opportunity to botanize along the river and among the hills. Sabinal signifies a Cypress grove, and the Cypress-trees grow along the river. Some individual trees are three to four feet in diameter. Most of them, however, like the Buttonball-trees of Kansas, have outlived their usefulness. Yet there are thrifty and vigorous trees here, which, left to themselves, will long preserve the significance of the name of the river and that of the little village near by.

Going from Sabinal we soon reach the valley of the Leona and of the near-by Nueces River. The valleys of those rivers are the lowest of any river valleys between the San Antonio and the Rio Grande Rivers. Irrigated farming there is already begun, and, doubtless, will be carried on to still greater success. Near Nueces River large Tree Acacias appear. That river, too, is about the eastern limit of Willow Catalpa, *Chilopsis*, which we shall see at different points far up into New Mexico. So Fallugia, with a still more northern range, grows southward to the Nueces.

A wide, deep and swiftly flowing current of water fills the river-bed, where two years ago I walked for miles without seeing a drop of water, and where on the dry sands I collected Fallugia, the small-fruited Walnut, other shrubs and many rare smaller plants. The country here assumes a more rough and mountainous aspect. The shrubs are sturdier in their growth and the flora generally is changing. The almost ubiquitous Mesquit is nearly everywhere and heavily loaded with young fruit. Because the Mesquit sometimes grows on the most barren hills it must not be supposed that the species does not recognize better opportunities when they present themselves. Those individuals now so forlorn, or, at least, their ancestors, have seen better days. In such localities they simply persist from a time when, perhaps, different climatic conditions prevailed here, or before a nomadic husbandry had made their homes a practical desert. Indiscriminate general grazing will make any country a desert.

No station on the Southern Pacific Railway, so easily accessible as Spofford, gives botanical tourists opportunity to find *Acacia tortuosa*. It grows a few rods above the station on the right-hand side of the road as one goes up. The flower-clusters of this species are very like those of *A. Farnesiana*, but its generic habit and its long Mesquit-like pods lead to its easy identification. It is hardly fair treatment of a peculiar and handsome shrub to call this species, as some botanists do, Mexican, as it is by nativity and residence a United States species. If the tourist can stop off a day at Spofford he will have time to visit Las Moras River, where he may find the remarkable semi-tropical white Water-lily, and the largest of our species of *Castalia*, *C. ampla*. I found it in the waters of that river, just in the rear of Fort Clark, and in full blossom on the twenty-second day of January, 1893, which, so far as I am informed, is the first time that the species has been identified as growing in Texas, or in North America, outside of Mexico. And if the tourist be curious in the so-called small things of science, he may chance to find in the same locality pods of the beautiful Red Bean, *Sophora secundiflora*, containing eight beans. The pods are sometimes fitted to hold only a single bean.

My stop at Del Rio was opportune to inspect the early summer flora, as I had already the late summer flora of that region. The Yellow Water-lily (*Nymphaea*), so common in the waters of San Filipe River, at Del Rio, varies somewhat from the more eastern forms of that species. The tabs of its leaves are produced, and end in an acumination giving to the leaves an elliptical outline. San Filipe River is about the southern limit of *Eysenhardtia orthocarpa*, with its upright fruit, as indicated by its name, while the pods of its southern congener, *E. amorphoides*, are reflexed. Nogal, *Juglans rupestris*, is very common along the river, where it sometimes grows into a large tree. Its fruit is small, but two or three times as large as that of the shrubby form.

From beyond the Sabinal to beyond the Pecos, at least, the honey-yielding shrub of western Texas, which Mexicans call Huajillo, and botanists know as a *Pithecolobium*, grows in great abundance. The groves of this species in flowering time are the favorite pastures of the bees, and at other times they are hardly less pastures for domestic animals, which largely subsist upon its leaves and fruit. Meanwhile the species finds time to manufacture in large quantities a strong and pleasant perfume. This species, *Acacia Farnesiana*, one or two other native Acacias and two or three species of *Mimosa* yield from their flowers such an abundance of strongly fragrant volatile oil that it might be profitable for perfumers to utilize them.

Both species of *Siphonoglossa* near Del Rio were in blossom at the time of my visit. They are curiously made and good-looking plants. Near them were growing *Krameria canescens*, another *Krameria* and a handsome shrubby *Lippia* producing its flowering stems in whorls around the main axis. *Xanthriza Texanum*, a handsome yellow-flowered composite, is common throughout central and western Texas, extending northward to southern Kansas. *Chrysopsis villosa* is an inhabitant of most of the region of the plains. It is a variant species. Several of its forms have been exalted to named varieties, an honor of which no one of them is really worthy.

Trichocoronis Wrightii, a western composite with variably cut leaves and rayless white flowers, is a plant of devious ways of living. It floats in the river, producing rootlets at the nodes of its stems. In shallow waters it roots in the soft bottoms. Where no water is to be found it grows equally well in the rich limon. The species probably located at Del Rio on account of the perennial waters of the San Filipe. The handsome *Centaurea Americana* of Arkansas and the Indian Territory extends through Texas to Mexico, and the small-growing Virginian Thistle bears it company all the way. *Cuscuta squamata*, one of the Love vines, grows abundantly on the alkaline soils of

western Texas. It lives generally upon composite, and more rarely upon Malvaceous plants. *Helianthus ciliolosa* is its favorite host, which it sometimes kills.

Ephedra pedunculata, a slender-growing species, too weak to stand alone, ascends as high as any of its congeners by associating with stronger friendly plants and rising with them. It is found at various stations along our way. *Apodanthera undulata*, an important member of the Squash family, inhabits western Texas and extends into New Mexico, with its large leaves, white flowers and ribbed fruit. The very handsome shrubby little *Dalea*, *D. formosa*, is seen at various points along our route and high up on Mount Franklin, at El Paso. *Hoffmannseggia drepanocarpa* is a Texan of long and respectable standing in good plant society. It is also common at Las Cruces, New Mexico, on the high mesa between the town and "Little Mountain." Fine specimens, and of larger growth than I have elsewhere seen, were growing near Albuquerque.

La Junta, Colo.

E. N. Plank.

Distribution of the White Cedar in New Jersey.

IN the peculiar climate and soil of the coast plain of New Jersey the White Cedar, *Cupressus thyoides*, a very valuable soft wood, finds a suitable environment. These trees produce many seeds even while very young, and these are widely disseminated by the wind. The trees grow with great rapidity, and there are extensive neglected areas where it can be profitably cultivated; and yet White Cedar is becoming scarce, owing to the demand for its timber, and no attempt is made to prevent its extermination. Less desirable species, which are fit only for fuel, have been and are still allowed to usurp its place. In the northern part of the state it grows in a very few isolated localities. Botanists have found it near the southern end of Greenwood Lake, swamp at Kingsland, New Durham and Secaucus swamps, meadows near Newark, Bergen Point and South Amboy (see *Catalogue of Plants*, Part I., vol. II., Final Report of State Geologist of New Jersey). But there is another station about a mile from High Point, and the posts and rustic work of the inn there are made from white cedar cut in this swamp. One is surprised to find a typical isolated swamp of White Cedar in a very thrifty condition growing in a little valley near the New York state line and fifteen hundred feet above sea-level. Other plants, such as the Pitcher-plant, *Sphagnum*, etc., which are common in the swamps of the southern part of New Jersey, are growing with the Cedar.

May's Landing, N. J.

John Gifford.

Foreign Correspondence.

Mr. Chamberlain's Garden.

THE eminent statesman who is now Her Majesty's Minister for the Colonies, the Right Honorable Joseph Chamberlain, has for many years taken a keen interest in Orchids, as well as in gardening generally, and his garden at King's Heath, near Birmingham, has long been famous for the collection of plants it contains, Mr. Chamberlain being as keen an amateur gardener as any in England. He knows his plants well and watches their growth and behavior with all the zest of a cultivator; indeed, I was informed by his Orchid grower, Mr. Burberry, that he almost daily inspects the collection and discusses the details of its management with the same thoroughness as he exhibits in his more serious work. Mr. Chamberlain's only recreation is his garden. Only a few weeks ago he wrote to Kew an account of some interesting observations he had made on hybrid Orchids with a view of ascertaining the prepotency of their respective parents, and this at a time when matters of state requiring the most delicate handling were under consideration. Mr. Chamberlain takes an interest in Kew, and it is partly due to his desire that Kew should be well equipped, that the completion of the large

temperate house has been undertaken at a cost of about twelve thousand pounds.

Highbury, the residence of Mr. Chamberlain, stands on an eminence looking south over the open country. The garden is not large, only about fifteen acres, but it is laid out with great taste in what is known as the natural style. Hollies, Rhododendrons and Conifers are its main features. Surrounding the garden stretch about a hundred acres of meadow-land so planted with trees as to form an important adjunct to it. The farming of this land is the hobby of Mr. Austin Chamberlain, M.P., who lives with his father at Highbury. Another son, Neville, manages an extensive estate in the Bahamas, devoted chiefly to the cultivation of Sisal.

The houses at Highbury are grouped about the residence, most of them being connected with it by a glass corridor some hundred and fifty feet long, one end of which opens into the conservatory, and this again into the drawing-room. The conservatory contains a rockery, cascade, fountain, etc., and is tastefully planted with Palms, Tree Ferns and Bamboos, with other plants intermixed. A large specimen of *Anthurium Chamberlainii* is a striking object in this house. Introduced accidentally from no one knows where, this grand Aroid flowered for the first time at Highbury about twelve years ago, when it was named by Dr. Masters and figured in *The Gardeners' Chronicle*. The only other example of this species is at Kew, where it flowers frequently and is now ripening seeds. The Highbury plant now has a stem as thick as a man's wrist and three feet high, bearing about a dozen enormous sagittate leaves. This plant also is ripening seeds. In one of the houses there is a batch of plants which are the outcome of crossing *A. Chamberlainii* with *A. Andreanum*; the flowering of this cross is looked forward to with considerable interest.

The corridor is draped with a selection of greenhouse climbers, and planted along one side with ornamental foliage and flowering plants. A large mass of *Hedychium Gardnerianum* filled a circular bed in the conservatory and looked particularly attractive in January, with its rich green, glossy leaves and spikes of fruit colored orange and scarlet, and more effective even than the flowers. Cultivators unacquainted with this character in *Hedychiums* sacrifice their winter value by cutting off the spikes as soon as the flowers fade.

A dozen houses open at right angles from the corridor, each containing some special kind of plant. There are also several houses behind these again, and a large lean-to range, recently built, is filled partly with *Dendrobiums* and other sun-loving Orchids, and partly with fruit-trees. Zonal *Pelargoniums* are favorites with Mr. Chamberlain, a house being filled with the best varieties to flower in winter. *Primula Sinensis* is well grown in Birmingham, several nurserymen there being famed for its cultivation. A house is devoted to it and to *Cinerarias* at Highbury. Winter-flowering *Begonias* are also a special feature there, especially the hybrids from *B. Socotrana*.

The Orchids are the principal attraction, about a dozen houses being filled with them. Mr. Chamberlain does not apparently care for *Cypripediums*, the only species I noticed there being *C. Chamberlainianum*, of which a plant bore a scape one and a half feet long with sixteen flowers, or, rather, that was the total number borne, this species being disappointing in its habit of developing only one, or at most two, flowers at a time. A house filled with *Cattleyas* in good health, and another with *Laelias*, chiefly forms of *L. anceps*, were remarked. The latter were represented by big specimens of the white varieties, that named *Sanderiana* by one plant with seventeen scapes bearing from three to five open flowers each; a second specimen, just over, had borne nineteen scapes with an aggregate of seventy-three flowers. The rare variety *Dawsoni* was in flower, and Chamberlain's variety, equally rare, was in good condition. The white varieties of *L. anceps* are not damaged by fog to the same extent as the type. *Dendrobiums* are favorites at Highbury, and many rare

species are represented there. *D. glomeratum*, a recent introduction, had slender pseudo-bulbs two feet long bearing clusters of flowers one and a half inches wide, remarkable for their small infolded labellum and rich glistening mauve-crimson color. *D. cymbridioides*, with the habit of *Cœlogyne* and slender racemes of pale yellow flowers, lined with red-brown on the lip, was in flower. I have not seen this plant elsewhere. A very fine example of *D. Falconeri* was suspended in the corridor, where it hangs all the year, and grows and blooms freely. Hybrid *Dendrobiums* of many kinds, not yet flowered, and, from their parentage, likely to be useful additions, were noted in one of the warm houses. A similar number of unflowered hybrid *Cattleyas* and *Lælias* occupied a shelf in the *Cattleya*-house. *Dendrobium nobile nobilissimum*, with a dozen pseudo-bulbs, each a yard long and as thick as a man's thumb; grand examples of *D. Wardianum*, *D. crassinode*, the rare *D. Lowianum* and such popular hybrids as *splendidissimum*, *Cassiope*, etc., were noted either in flower or in bud.

Miltonia vexillaria and *M. Roezlii* are exceptionally well grown at Highbury, and in the same house with the latter I noticed a good example of the miffy *Phajus tuberculosus*. A house filled with forms of *Cattleya gigas* and *Cœlogyne cristata*; another with good varieties of *Odontoglossum crispum* and allies, and another with *Masdevallias* revealed careful and skilled management.

Cool Orchids generally are well represented at Highbury, and in the middle of January the display of bloom was rich and varied. *Odontoglossum coronarium* is grown there astonishingly well in a cold house on a turf of fibrous peat resting on a wood-raft and placed close to the roof glass in a shaded position. Here it has formed a mass two feet through of healthy pseudo-bulbs and leaves, and a short time ago it bore seven strong spikes of flowers. *Epidendrum vitellinum* is also an exceptional plant under Mr. Burberry's care. *Odontoglossum citrosum*, *O. Cervantesii*, *Oncidium macranthum*, *O. Leopoldii*, *O. Andersonianum* and many others were remarkable either for their flowers or healthy vigorous growth.

Mexican Orchids are well grown, the secret of success being, no doubt, the light houses in which they are accommodated and which are never shaded. A house partly filled with *Phalaenopsis* was a source of anxiety to Mr. Burberry, who finds what many others have found in the continued cultivation of this genus, namely, that the plants are apt to go wrong without any apparent cause.

Tea Roses and Carnations are largely grown under glass, these being the favorite flowers of Mrs. Chamberlain.

A novel feature of the houses at Highbury is the possession of electric light, which is so fixed that at night by touching a button Mr. Chamberlain can transform his houses into a veritable fairyland, which can be inspected by his guests with comfort and without any risk of catching cold.

London.

W. Watson.

New or Little-known Plants.

Rhododendron mucronulatum.

THIS deciduous-leaved shrub, raised in the Arnold Arboretum from seed gathered on the mountains near Pekin, and sent in 1883 by Dr. Bretschneider, at that time surgeon of the Russian Embassy in the Chinese capital, is closely related to the Siberian and Manchurian *Rhododendron Dauricum*, although, for garden purposes at least, it will, perhaps, be well to consider it distinct. In American gardens it is now a robust shrub from three to four feet in height, with slender stems, and branches clothed during their first year with smooth, rather light yellow bark. The leaves, which do not unfold until after the flowers have begun to fade, are oblong, gradually narrowed to both ends, and mucronate at the apex, very finely serrate, thin and firm, dark green above, pale and pubescent below, from two to two and a half inches long, about an inch wide and short-stalked, turning in the autumn, before fall-

ing, bright scarlet. The flowers are broadly campanulate, about an inch across, and light clear rose-color, with broad rounded corolla lobes, and are produced in two to four-flowered clusters; they appear in eastern Massachusetts during the last week in April, before those of any other plant of this class, and at a time when comparatively few other shrubs are in bloom. Their brilliancy and cheerfulness and the splendid color the leaves assume late in the autumn make this little *Rhododendron*, which is very hardy, a most desirable inhabitant of northern gardens.

*Rhododendron mucronulatum** (see illustration on page 65 of this issue), which the Russian botanist Maximowicz, who made a special study of these plants, considered merely a geographical variety of *Rhododendron Dauricum*, inhabits south-eastern Siberia, Russian Manchuria and northern China.

C. S. S.

Plant Notes.

BEGONIA SOCOTRANA.—Plants that produce abundant crops of flowers in northern gardens during the short sunless days of November and December are not very numerous, and every addition to their number is eagerly welcomed by gardeners. Last year we spoke of the value of the winter-blooming tuberous-rooted *Begonia Socotrana*, and the sight of a house in December filled with plants of this *Begonia* in the neighborhood of Boston has served to confirm the good opinion of it we have already expressed. The bulbs begin to grow and are potted in July, and the first flowers appear at the very end of October and continue to open for six or seven weeks, the plants being well covered until after Christmas. The flowers are large, of a beautiful clear pink color, borne in ample open clusters and raised well above the large bright green, lustrous, peltate leaves. Flowering plants stand well in conservatories, and are admirably suited for the decoration of dinner-tables; and cut flowers remain in good condition for nearly a week in the temperature of an ordinary living-room. *B. Socotrana* is so easy to cultivate, and increases so rapidly by the development of new tubers, giving such large results for a small outlay, that it will probably become a popular florist plant as soon as it is better known and its value for late autumn and early winter decoration is understood.

ULMUS RACEMOSA.—The American Elm, or White Elm, as it is sometimes called, has so long been a favorite tree for ornamental planting and has been used so universally along country roads and city streets, by lonely farm cottages as well as in urban parks and the grounds about stately villas, that our other native Elms have been quite overlooked. There is an excuse for excluding the Slippery Elm from public grounds and streets because it is difficult to save it from the predatory small boy, whose appetite is tempted by its fragrant and mucilaginous inner bark. Nevertheless, this tree transplants easily, grows rapidly into a beautiful shape, and is worth a place in any private collection. The beautiful Cedar Elm, *Ulmus crassifolia*, ranges too far south for our climate, although in Texas it is one of the most graceful of our forest-trees. The Wahoo, too, *U. elata*, another attractive tree, is also doubtfully hardy north of Washington, but there is little excuse for neglecting to plant the Cork Elm, *U. racemosa*, also locally called the Hickory Elm and Rock Elm. It is a useful tree with hard close-grained wood that polishes well and is valuable for every purpose where strength, toughness and flexibility are required, so that it is well worth planting as a timber-tree. But it is also attractive as a shade-tree for its distinct and handsome appearance. At its best it is a hundred feet high, with a trunk three feet through, a narrow rounded head, and leaves which are deep green and glossy above, paler and covered with a soft pubescence below. In autumn these turn to a clear bright yellow. It does not grow as rapidly as the White Elm, but it is a vigorous thrifty tree, and

* *Rhododendron mucronulatum*, Turczaninow, *Bull. Soc. Nat. Mosc.*, x., 155 (1837); *Fl. Baicalensi-Daurica*, II., 208.—De Candolle, *Prodr.*, vii., pt. II., 327.

Rhododendron Dauricum, β *mucronulatum*, Maximowicz, *Mém. Acad. Sci. St. Pétersbourg*, sér. 7, xvi., 43 (*Rhododendron Asiæ Orientalis*).

certainly does not deserve the utter neglect with which it has been treated. The tree has acquired its common name from the broad, irregular corky wings with which the stiff branchlets are usually furnished.

Cultural Department.

Amaryllis.

UPON looking over the stock of mature bulbs of Amaryllis at this time I find that many need encouragement as the flower-spikes are just showing up. It is sometimes desirable

until warm weather this early start will give the bulbs a long season of growth, and the foliage will be sufficiently matured on the arrival of frost in autumn to allow that the pots be put on their sides under the stages, or in some convenient place in the greenhouse of no special value for other plants. If the pots are stood on an earthen bottom after the leaves have died off it will be found that very little water will be needed during winter, as the pots will absorb enough moisture from the earth to keep the roots from becoming too dry. Amaryllis of the hybrid section, such as are generally grown, are almost truly deciduous; but a few roots are sure to remain in a living state, and the more there are the better will be the start made from this time on. The effort the plant is required to make in



Fig. 7.—*Rhododendron mucronulatum*.—See page 64.

to have them come on in succession, and in this case it is best not to repot all the bulbs now, but only those that are most advanced, starting the others later as they require. We have found, however, that it is not well to retard Amaryllis-bulbs to any great extent beyond their natural flowering time. Last year the display would have been of little value to us before May, and an attempt was made to keep them for this time, but the spikes received a check, and were not nearly so fine as if encouraged to come on steadily from the time they were potted. Indeed, many did not develop beyond the bud-stage. On the other hand, if started now and kept in moderate warmth

producing the large flowers is considerable, as may be easily seen by the shrunken condition of the bulbs that were plump and fat before starting to grow, and it takes them all summer to recuperate and lay a foundation for the following year.

At potting-time it will be found that there are a number of young offsets clustered around the parent bulb. It is preferable to keep to a single bulb in a six or seven inch pot after the flowering size and strength has been attained, and these offsets may be planted around the edge of other pots to grow on separately. If space is limited, later on in early summer they may be planted out in the open ground, where they will make

a good growth if carefully protected from frost, to which they are most susceptible both in spring and fall. Flowering-size bulbs may be planted in pots of large size, several in a pot, but I am of opinion that for decorative purposes they are more serviceable when dotted in among a groundwork of green, owing to their scant foliage. A setting of *Adiantum cuneatum* is especially useful for this purpose. Another reason why pots of a small size are to be preferred is because of the ease with which these can be stored in winter. They will stand on a very narrow margin next the walks under the benches, not too near the heating pipes. It will have much to do with the popularity of *Amaryllis* when it is realized how easy it is to store the pots when the benches are crowded with other occupants.

For potting material we use a good sound loam made rich with the addition of bone ground moderately fine. Bone-meal should not be used, this being apt to close the pores of the soil and prevent proper aëration, a most important point in the culture of all pot plants. To assist aëration we use coarse sand and charcoal dust, and if the loam is naturally heavy or retentive some leaf-mold or material from an old Mushroom bed to lighten it. *Amaryllis* have thick succulent roots and like a rich, free-rooting soil.

It is also desirable to place the pots where the soil contained in them will be at least as warm or a little warmer than the temperature of the structure in which they are. To accomplish this the great English growers place them in a gentle bottom-heat of some fermenting material until the flowers are developed. But this is not necessary if the pots are placed on a bench over the heating pipes, and some non-conducting material, as sand, put between the pots. A part of a propagating bench is as good a position as one could desire. The roots will start and grow without any check, and sometimes the quantity of bloom is doubled by this means.

Thrips are the one enemy to be avoided in *Amaryllis* culture, and their work is shown by the under sides of the foliage turning red in spots. A wash with any approved insecticide will banish them if followed up once or twice at intervals of a few days. No shade is needed at any time, except to prolong their beauty when the flowers expand, the *Amaryllis* being a native of south Africa and a sun-loving plant.

This is a good time to sow seeds of a good strain. These have a peculiar black envelope like tissue-paper. The germ is small in comparison with the envelope, and the whole is easily lost from overwatering before germination takes place. To avoid loss, the seeds should be pressed into the soil on edge when sowing them, covered lightly with very sandy soil and placed in a temperature of seventy degrees, Fahrenheit, until they are well up. Seedlings will be found to keep their foliage during winter until the flowering stage has been reached; this varies from two to three years. As soon as the plants are strong enough to bloom the leaves will die off each year in autumn. Young bulbs must, therefore, be given encouragement during winter and summer from their infancy until they show signs of maturity, and after that they must have an annual rest of four to five months. There are evergreen species of *Amaryllis* in cultivation that have been derived partly from *A. aulica*, which is evergreen, and from a packet of seed it is often noted that some plants are obtained whose leaves never die down. These are the exceptions, and must be treated accordingly, as an attempt to dry off the foliage will most likely result in no bloom the following year.

South Lancaster, Mass.

E. O. Orpel.

Showy Acanthads.

PERISTROPHE SPECIOSA, introduced from the East Indies about seventy years ago as *Justicia speciosa*, was for some time a favorite winter-flowering plant; but like many others cultivated then it is now seldom seen. When well grown it is a pleasing subject for an intermediate house in the winter months. Many good Acanthads are neglected because they are almost useless for cutting purposes, their flowers being fugacious. It is unfortunate that many persons like plants only for their usefulness for cutting, especially as not a few of our most showy flowers have short lives. Although the flowers of this plant do not last long when cut, they are produced plentifully on the plants for several weeks. *Peristrophe speciosa* is an erect plant, branching freely, and its stem and branches are thickly clad with opposite, ovate, acuminate, pale green leaves. The flowers are about one inch long, and the twisted tube is a pale purplish color, while the two elliptic oblong lips are a rich carmine-purple. One-year-old plants give the most satisfaction, as they are more neat and compact than older ones. The tips of the young branches make good cuttings, and if rooted

in April and planted out in the garden in May they make large plants by the end of August, when they should be taken up.

Another Acanthad that deserves special notice at this time is *Strobilanthes anisophyllus*. It is a handsome, graceful and very floriferous plant; in fact, every twig and branch is loaded with flowers. The graceful branches, about one foot and a half long, have opposite unequal, lanceolate, acuminate leaves. Its flowers are of a pleasing lavender color. The showy part is the corolla, which is more than one inch long and about three-fourths of an inch wide at the mouth. It was introduced from Sylhet in 1823 and was known under the generic name *Goldfussia*. Another species which flowers at this time, *S. isophyllus*, makes a compact little bush, but is not so graceful as *S. anisophyllus*. The stems and branches are more erect, and its leaves equal or nearly so. Its flowers are lavender color and about the same size as those of *S. anisophyllus*. Both are easy plants to grow. Cuttings of the young growth made in March root easily with a little bottom-heat. When well rooted they should be put into small pots, giving another shift into larger pots as needed. As soon as the weather is warm they should be planted out in the garden, where they grow vigorously if given plenty of water. To get nice bushy plants the young points of the branches must be cut back regularly until the last week in July. They may be taken up about the last week in August, when they will be large enough for six-inch pots. They thrive in a compost of good loam, mixed with a small quantity of dried cow-manure and some leaf-mold and sand, and flower well in a temperature ranging from fifty-five to sixty degrees.

Botanic Garden, Harvard University.

R. Cameron.

A Few Momordicas.

THIS genus, which contains some twenty-six species of annual, or, in a few cases, perennial climbers, is distinguished by the neat appearance of the foliage, small yellowish flowers, the male peduncles of which bear a bract. The fruit is usually bright-colored and fleshy, bursting open when ripe.

Momordica balsamina, the Balsam Apple, has deeply and much lacinated palmate leaves of a dark green color and short, smooth orange-colored fruit. This species is often confounded with *M. Charantia*, the common Balsam Pear, the leaves of which are palmate like the other, but the lobes are rounded and not deeply sharp-pointed. The fruit is yellow, elongated and covered with many angled tubercles. The fruit preserved in spirits is commonly used as a vulnerary. Another species which we had here last summer was *M. Martineseum*. I can find no record of such a name. The flowers are whitish; leaves a little like those of *M. Charantia*, and fruit resembling that of *M. balsamina* in shape, but paler in color. The seeds were in a collection sent from the West Indies to the University six or seven years ago and had been in the museum since.

The *Momordicas* are easy of culture, and the seeds, if placed in the ground where they are to grow, after danger from frost is past, will quickly spring up. Given a few strings or wires to run upon, and left to themselves, they will quickly form a nice screen, and, what is more important, will retain their dark green elegant foliage until pretty late in summer, even after all other cucurbitaceous climbers are withered.

Allied to *Momordica* is the genus *Luffa*, which has no bract on the male peduncle and has a long cylindrical fruit or pepo, which at length becomes dry and fibrous within. They are climbers somewhat coarse in appearance, having large leaves and yellow flowers. The chief interest in these plants lies in the fibrous fruit which often attains a length of two feet or more. As it ripens, the outer skin becomes dark and dry; then a little circular lid at the tip opens and gives the elliptical black seeds a chance to drop out. The skeleton of the fruit can be used as a wash-cloth, whence the common name of Wash-cloth Gourd. Prepared by softening and bleaching it is sold in drug stores for use in the bath-room. There are many species known, but *L. Egyptiaca* is the most common form. They are easily grown, though, like the rest of the family, they do best in a very rich open soil.

Botanic Garden, Univ. of Pa.

Alex. MacElwee.

Notes from Santa Barbara.

Tecoma Smithii.—Plants of this shrubby hybrid, raised from seed received about a year ago from its originator, Mr. Edward Smith, of Adelaide, South Australia, are in bloom now, and, for the sake of variety at least, will prove a welcome addition to our flowering shrubs. It must be confessed, however, that both the parents of this plant—namely, *Tecoma velutina*, with yellow flowers, and *T. Capensis*, with scarlet flowers—have

more intrinsic ornamental value than this new intermediate form, which partakes of the characters of both.

Berberis pruinosa.—This recent introduction from Tibet, through the French missionaries, proves to be a neat and attractive little shrub, the new growth, the underside of the leaves and the abundant berries being all pure white and the flowers sulphur-yellow. Here it flourishes in full sunshine, as does its antarctic congener, *Berberis Darwinii*, from southern Chile and Fuegia. A fine bush of the latter, literally covered with its rich orange blossoms, is just making a suggestive contrast with the numberless bunches of the crimson-flowered tropical *Passiflora princeps*, which covers an extensive trellis close by.

Polygonum elegans.—This is a half-shrubby Buckwheat, growing about two feet high and twice as much across, with nearly leafless wiry stems and myriads of small white flowers. It makes a first-rate plant for the rockery or the herbaceous border, besides being useful for cut flowers. It is a native of Mount Gargano, in southern Italy, and will prove satisfactory, even if grown in pots.

Tagetes lacera.—This is one of a large number of new plants lately discovered by Mr. Brandegee in the extreme south of the peninsula of California. It makes a pretty compact bush, four to five feet high, well furnished to the base with finely cut metallic-green foliage, having the peculiar smell of other Marigolds, and bears a profusion of yellow flowers, mostly produced in winter. Small plants can be well bloomed in pots.

Pittosporum phylliræoides.—This is a striking species from the desert regions of Australia and quite distinct in habit from all others with which we are familiar. It resembles an evergreen Weeping Willow, with yellowish, rather small solitary flowers in the axils of the leaves, succeeded by far more conspicuous yellow elliptical fruits.

Santa Barbara, Calif.

F. Francheschi.

Crassula quadrifida.—This plant is now in full bloom in the succulent house, and is one of the best of the species. The leaves are thick and leathery, ovate spatulate in form, at first sessile, afterward forming a short petiole, and arranged decussately on the stems. The flowers are borne in terminal panicles; the under sides are bright pink and the upper a very light pink. The parts of the flower are all in fours. The individual flowers do not exceed half an inch in diameter, but the quantity produced makes it a very attractive plant. It is, moreover, well adapted for a hanging basket, as the lower branches droop gracefully round the pot in which it is growing. It is also an excellent window-plant, as the leaves are of good texture, well able to withstand a dry atmosphere and at the same time it requires but little water.

Cotyledon gibbiflora.—This plant is now in full bloom in the same house and is better known under the name of *Echeveria metallica*. The fleshy leaves are about six inches long by two wide, arranged alternately round the top of a short thickened stem, and of a metallic color. The flower-stalks, which are some two feet in height, grow from the axils of the lower leaves and are clothed with small leaves alternately disposed. The flowers of this plant are singularly beautiful, and are what are termed perfect flowers, all the parts being present. The calyx is composed of five spreading sepals, much the same color as the leaves. The corolla is of a rich salmon, and composed of five upright petals. There are ten stamens and five pistils.

Perhaps it may be added, in this connection, that one of the best ways of drying succulent plants for herbariums is to dip the specimen in very hot water, when it may be pressed with as much ease as any ordinary plant, and the flowers will retain their color.

Northampton, Mass.

Edward J. Canning.

The Pleiones.—This group of very dwarf, large-flowered Orchids is now generally included under the genus *Cœlogyne*. The plants, although quite beautiful, are seldom seen in this country, but deserve to be grown even in choice collections. They are natives of Assam, Nepal and Sikkim, and plants with shriveled pseudo-bulbs close to the ground and deciduous foliage of a membranous texture. The flowers are produced in great abundance, but are almost sessile and solitary white or rose-colored, with or without yellow veins in the lip. Some are exceedingly showy, others are chiefly of botanical interest. All flower freely under cultivation—almost resembling certain varieties of *Crocus* when seen at a distance. The flowers appear before the leaf, or, in other words, during the period of rest, which occurs at different times for different species. Most common is *Pleione lagenaria*. The sepals and

petals of this species are of a rosy lilac, the lip being pure white, with yellow and crimson bars and veins. The leaf is solitary, membranous and plaited, springing from a peculiar wrinkled, bottle-shaped pseudo-bulb. *P. humilis* is another common kind, with flowers smaller than those of the first-named species, almost white, with the lip marked with brown and crimson or yellow. The flowers are numerous and appear late in fall. *P. maculata* is one of the finest of all, with pure white sepals and petals and lip barred with crimson and yellow. The flowers appear late in fall. *P. Hookeriana* is one of the smallest of the section, very dwarf, with rose-colored flowers produced in spring, at the same time as the leaves. *P. Wallichiana* has large, sweet-scented flowers of a bright rose-color. All the species do best in shallow pans, in equal parts chopped peat, sphagnum and silver sand and an addition of well-decayed cow-manure. A cool, airy position is most suitable to them. During the growing season an abundance of water should be given, and then gradually withheld as the young bulbs have reached a normal size. The plants should then be allowed to rest until the buds begin to appear.

Newark, N. J.

N. J. R.

Correspondence.

Old Stone Bridges in Pennsylvania.

To the Editor of GARDEN AND FOREST:

Sir,—Your picture of an English stone bridge again reminds me that such bridges are numerous in south-eastern Pennsylvania—one over the Pickering Creek, just above where it empties into the Schuylkill River, in Schuylkill township, Chester County, forming part of the old highway to Philadelphia, along which the armies of Washington and Howe encamped and marched in the autumn of 1777. Valley Forge is two miles below. There are stone bridges, some of them with several arches, over the Perkiomen, the Manatawney, the Brandywine and other streams in south-eastern Pennsylvania. The one over the Perkiomen, in Montgomery County, built in the last century, partly with money raised by a lottery, is the subject of these appreciative lines which I find in "The Perkiomen Region":

The bridge of old-time masonry, intact,
Untouched by passing flood or rising tide,
A monument unshaken, stanch, compact,
Standing so firm and strong, to pick our pride,
Asks us, who builds to-day, with conscience pure,
The sterling structures that shall still endure?

But, besides the poetess, the county commissioners and judges of Chester and Bucks Counties have lately been drawing a comparison between the durability of the old stone bridges and the new and ugly iron bridges. This investigation shows that the iron structures cost for repairs, painting, etc., every year, more than the stone bridges have cost in half a century.

Philadelphia, Pa.

Isaac R. Pennypacker.

Training Tomatoes.

To the Editor of GARDEN AND FOREST:

Sir,—Referring to the Tomato-trellis described on page 37, I would say that for several seasons I have used wire netting in my garden for training Tomatoes in preference to stakes and strings. Netting three feet wide, securely tacked to strong stakes set at intervals of three and a half or four feet apart was formerly used, but greater width is desirable. This forms a perpendicular trellis about four feet high, as the wire should be placed ten or twelve inches from the ground. Stakes two by four inches are heavy enough if braced the first season, although I have used three-inch hard-hack fence-posts. A light strip of wood may be run across the top for staying the upper edge of the wire, but this is not essential unless heavy blankets are to be used for protection against light frosts in autumn. Raffia, once used for tying the vines to the wire, will never be superseded by strings; it is always soft, pliable and strong, never stretching in wet weather or slipping if properly tied.

This method of training Tomatoes admits air on all sides and does not interrupt the sun's rays. The fruit ripens evenly, is easily picked and readily protected on cold nights.

An ideal trellis of this sort was developed in a neighbor's garden the past season. Ten-foot stakes and netting two feet wide were used. But the growth of the *Ponderosa* is phenomenal, and two other strips of netting were added, with a space of a few inches between them. The result was a handsome screen fully eight feet high, thickly decorated with crimson fruits. The aspirations of the vines, however, were

unsatisfied, and a foot more of netting would have been covered. The expense of such an arrangement is light, and the profit and pleasure arising from clean well-ripened fruit is satisfactory in every way.

Trishard Mts. Va.

G. A. Woolson.

Habits of Ferns.

To the Editor of GARDEN AND FOREST:

Sir,—Regarding the habits of *Aspidium aristichoides* (see page 18), I think that an examination with an ordinary lens will show that the fronds become prostrate through the decay of the tissue at a point not far above the ground. To my mind, these fronds are not "protecting themselves from snow," but anticipating death, in order to give way to the new fronds next spring. They are always when prostrate entirely limp at this point just above the surface.

A specimen at present in our window was taken from the forest in November last. The matured outer fronds are prostrate, but the younger inner ones are as perfectly erect as ever. At the time this plant was dug most of its neighbors had perfected the size of their fronds, and were then wholly prostrate. The specimen in question was selected because of its evidently less mature, and still erect, fronds. It is much admired by visitors, few of whom know that it is one of our native Ferns.

Cranford, N. J.

C. S. Valentine.

Meetings of Societies.

The Western New York Horticultural Society.—III.

WILL IT PAY TO PLANT MORE APPLE ORCHARDS?

Mr. Willard thought that apple-growing was still too much neglected. Orchards once profitable are now decaying; many are practically worthless, and in western New York there are not enough young trees planted to take their places. The acreage of other fruits is increasing, but the one kind of fruit which a young farmer should plant, because he will be sure in later life to reap the benefit of such an outlay, is the Apple. The scab is the worst foe of Apple orchards, and the great need is scab-proof varieties. The old Baldwin is one of the kinds which are the worst affected. If badly attacked one season the effects will continue the next year. The disease can be held in check by spraying, and the trees should be strengthened by strong feeding. Varieties known to be almost scab-proof should be selected, such as Duchess of Oldenburg, Sutton's Beauty and Hubbardston. Sutton's Beauty is the best variety we have, and will be free from scab in seasons when the Baldwin is ruined. Mr. Willard had one tree with Longfield and Baldwin grafted on the same root. Longfield bore good fruit and smooth, when the Baldwin apples were worthless. Mr. Morris, of Ontario, said that Canadian apples sold better in the market than the United States apples, not because of freedom from scab, but because they were packed better. Mr. Woolverton said that the Government of Ontario sent three different teams of men to show fruit-growers how to spray. They did the work well—sprayed in thirty different places six times—and it was a very helpful experiment. He found the Cranberry Pippin not superior in quality as a winter apple, but scab-proof. It commands a good price in Liverpool and Glasgow, and has been shipped, when carefully selected and wrapped in tissue-paper, to New South Wales. The Baldwins did not stand the journey as well as the Cranberry Pippins, which were considered the best apples there. Mr. Fowler said that while the Ben Davis was not found in fancy-fruit stores the pie-bakers bought it by the carload. With many people the Cranberry Pippin was no better than Ben Davis. The Wealthy is apt to overbear, but, if thinned out, is an excellent apple, and is practically scab-proof. In Chicago the Ben Davis brings \$2.50, while Snow apples brought out from cold storage sold for \$6. Mr. Van Deman said that the Mississippi Valley, from Ohio to Kansas, was the true home of the Ben Davis, and that the season was not long enough for it in New York or Ontario. He spoke of the York Imperial as a good business apple. Stark is not high enough in color, and is astringent in quality. What the market demands is a rich, bright apple. York Imperial is far better in quality than the Ben Davis. The best fruit of this variety is grown in Pennsylvania, and it stands high in Liverpool markets. Mr. Hale thought that there was no better outlook for fruit-planting than winter apples of high quality and bright color. It would pay in New England. He proposed next spring to plant Sutton's Beauty, feed it well, thin the fruit, and then watch and spray.

THE CULTIVATION OF THE DEWBERRY.

According to Mr. J. A. Wilcox, the growing of this fruit began about twenty years ago, but not until within a dozen

years has any attention been given to it in a large way. Of about a dozen varieties the best for this region is the Lucretia, and often where it is said to have failed the roots planted were not true to name or the plants have received improper care. Mr. Wilcox had increased his plantation from year to year, and with continued satisfaction, and only regretted that he did not do so more rapidly. This Dewberry was found in West Virginia by a Mr. Williams, of Miami County. Some plants were sent to his father and five to Mr. Alwell, in Illinois. These last grew and matured, and from them all the stock has come. Dewberries do well on gravel, clay, loam and sandy loam. They ripen the earliest on gravel, but the loam is the best in dry seasons. They should not be planted where the roots will heave or where the snow will blow off. They need all the sunshine they can get and, therefore, should never be planted under trees, although wind-breaks help them. They can be transplanted with the green shoots started, if three or four inches of the roots are kept, and they should be set about three inches deep, with the soil compactly pressed about the roots, in rows six feet apart, with the plants three feet apart in the row. The plants should be kept clean and the surface loose by frequent cultivation, and a growth of from three to six feet may be expected the first year. Plants increase from the tips, which often will color at the ends when they are ready to root. These tips should be covered to encourage rooting. They will be ready for this covering at different times, so the field should be gone over two or three times to get them all. If covered too soon the tip will keep growing and not root, and the covering will need to be repeated. When the buds start in the spring plants should be pruned, and all the wood that has been winter-killed should be taken out. Three canes three feet long, or, as the bushes get older, five or six canes may be left. A wire trellis, preferably three wires, the lower one being three feet from the ground should be used, and the vines will spread on the wires. The berries should be picked every other day as soon as they are well formed and colored, and they will not turn red if left in the sun after picking as blackberries do. Cultivation after harvesting is not advised, nor is it advised while the plants are in blossom, but the special merits of the Dewberry are its large size and early ripening. Last year the fruit was fit to market on the 30th of June, which was earlier than usual and some two weeks ahead of blackberries. The berries average twelve cents a quart, and the vines yield 2,000 quarts an acre, or under heavy fertilization 3,000 quarts. The demerits of the fruit are that it is not quite as good as the best blackberries, and the plants are not perfectly hardy. It is safest to protect even old plants, and it requires more skill to grow them than it does the bush berries. So far the plants are comparatively free from disease, the most serious one being an insect which bores at the base of the stalks.

THE BUSINESS OF FRUIT-SELLING.

Mr. J. H. Hale, of Connecticut, said that the marketing of fruit begins properly with selecting the right varieties and planting them properly. For complete success the fruit grower must go to the wholesale market, to the retail market, and, if possible, to the consumer, to learn just exactly what is wanted. In this way the grower can, to a certain extent, educate the market, which is also a good thing, but he must understand primarily what the people want. The more time a grower spends in the market the better is the form in which his goods will be placed. A fine appearance opens the consumer's pocket-book, and then quality keeps it open. To make a real success one must have a genuine affection for his fruit. He must believe in it, and he must impress this belief on his pack-ager. After he has done all this he must go to the dealer and tell him what he proposes to do and impress this sincere intention upon him. The commission man must be made his partner, and the grower should only take as a partner a man who honestly loves his business, takes an interest in it for its own sake and for his reputation sake, as well as for mere money. The grower should induce the marketman to come and look at his orchards, even if he has to pay his fare. Then he can say, "I know this fruit, I know how it is picked, I saw it packed and taken care of," and he will receive more for it than if his interest was not thus aroused. To catch the eye the fruit must come as near to maturity as possible to get its proper color, and it will then hold the consumer, too, as its finest flavor is only developed in these last hours. The rule should be: Pick quickly, store promptly in a cool place, cure carefully, pack honestly, and use such packages as the market demands, as, for example, baskets for Philadelphia, boxes for Chicago, etc. Honesty is the best policy; well-graded fruit will sell for forty per cent. more than ungraded fruit from the same locality. The Chautauqua grape shippers lose much in

losing their individuality. An established reputation is worth a good deal. Certain growers habitually receive twenty-five per cent. more for the same fruit than their neighbors because the dealers know their grades. The use of printers' ink pays. Buyers ought to know what growers have to sell. There is a growing demand for the very best. Mr. Hale's own first-grade peaches sell the easiest, and they bring \$2.50 a basket; the third grade sells the slowest, and for these he only gets seventy-five cents, and sometimes only fifty. This year his Georgia orchard came into bearing. He had a man in each large city who devoted his entire time to placing his peaches during their short season. He never ships to more than one man in any place. These chosen men were enterprising; they had informed retailers of what was coming, so that the crop was picked, packed and railroaded as rapidly as possible to a market already waiting for the product. Mr. Hale attributes whatever success he has made largely to methods of marketing. There is certainly not enough profit in the fruit business to let this practical end of it run itself.

PEACH-GROWING.—This industry is profitable in western New York, if conducted on strictly business principles. Peaches have the advantage of coming into bearing earlier than Apples. The fruits should always be thinned, so that they remain from six to eight inches apart on the branches. The trees will grow on almost any soil, if the cultivation is adapted to it, but, according to Mr. Hale, a light loam is an ideal Peach soil, except for Crawford's Late. The fourth-year trees on light land are twice the size of those on clay. Perfect drainage is essential, and thorough cultivation. The Crawford is the most tender type of Peaches, while Elberta is one of the hardiest, ranking with Mountain Rose and Stump. Mr. Hale thins when the peaches are about the size of a walnut. He prunes to a single stem at planting, with three main branches shortened in to six inches or more, and cuts away the limbs which interfere. He wants low-headed, well-branched trees shortened back every year about a half of the growth. He prunes for form, but does not prune until the buds are swollen, so that he can be sure to cut away dead wood. In this way he often gets badly formed trees, but they bear fruit. The distance from the ground to the first branch is from fifteen to twenty-four inches.

Peninsula Horticultural Society.

THE ninth annual meeting of the Peninsula Horticultural Society was held in Denton, Maryland, a fortnight ago.

The Fruit Committee reported the Tennessee Strawberry as one of the most promising. It is as early as Meek and produced well the past season. Greenville is one of the most desirable for ordinary growers. Timbrell and Marshall have not met expectations. Brandywine, on the lower part of the peninsula, shows a tendency to rust; Lady Thompson lacks productiveness, but is highly praised by many who have fruited it; Bubach is the most extensively grown. The Strawberry weevil, *Anthonomus signatus*, seriously injured the perfect flowering varieties in the vicinity of Denton the past season. The best preventive is the single-crop system and burning over the fields soon after the berries are picked.

The Blackcap Raspberries have not proved a profitable crop, and the early red varieties have almost entirely superseded them. The Miller is largely planted and has proved productive and a good shipper. Loudon is promising. Marion is a stout grower. The Wilson Blackberry has been partially discarded for a few years, but is now coming to the front again and has been quite largely planted. Maxwell and Eldorado are on trial; the latter, though producing fine crops of large berries, may prove too late in ripening. Lincoln is worthy of a trial.

Many Peach orchards failed the past season on account of the destruction of the blossoms by a fungus which was aided by the moist condition of the atmosphere. Yet the reports show that from two-thirds to three-fourths of a crop brought remunerative prices. Elberta has proved one of the most desirable varieties. The Committee on Peaches reported that the area of young orchards is on the increase in western Maryland. While the last season's crop was below the average in yield, satisfactory prices were secured by the growers, and the money was received as soon as the fruit was loaded into the cars.

Plums and Apples have been largely planted during the year. The Japanese varieties of Plums give the best satisfaction; Abundance, Burbank and Ogon being most extensively planted. An acre and three-fourths of land near Smyrna, Delaware, which was planted five years ago with one hundred and fifty Abundance, ten Kelsey and ten Ogon trees, between the rows of which were 1,200 Currant-bushes, netted the owner \$650 during the past season.

A marked feature of the meeting was the display of fruit from Delaware and Maryland. There were 250 plates of apples exhibited, comprising ninety varieties, several varieties of pears, chestnuts, walnuts and filberts. A striking contrast was shown between the apples from trees sprayed during the season and from those not sprayed, the fruit from the former being much fairer and of better color than that from the unsprayed trees.

The San José scale appears to have gained a foothold in numerous localities in Maryland, and vigorous measures will be necessary to prevent extensive damages to the fruit interests of the state in future. Mr. R. S. Emory, of Chestertown, has been making a vigorous fight the past year to exterminate it in portions of his Pear orchards, which have become badly infested. He stated that whale-oil soap, manufactured from oil containing its original impurities, had proved effectual in destroying the scales. He used two and a half pounds of the soap to one gallon of hot water, and sprayed the hot mixture on the trees after the leaves had fallen. Mr. Emory has one block of almost 300 Pear-trees, planted in the fall of 1888, which were found to be nearly covered with the scale in the fall of 1894. Since that time he has repeatedly treated them with various insecticides, such as kerosene emulsion, whale-oil soap, etc. At this time the hot mixture of whale-oil soap appears to have been effectual in freeing the trees from the scale. The Delaware Experiment Station officials reported that 116 suspected orchards in Delaware had been visited and the trees examined during the past season. The San José scale was found in thirteen localities in the state. The infested trees, in nearly every instance, were at once destroyed, and others have been treated with insecticides under the supervision of the station entomologist. The society urges the passage of laws that will prove effectual in preventing the spread of injurious insects and fungal diseases, and, whenever practicable, to exterminate the same.

Mr. J. J. Rosa, of Milford, Delaware, a successful grower of Sweet-potatoes, gave an interesting talk on his method of cultivation. The Big Stem Jersey variety gives the best satisfaction. The plants are grown by the use of bottom-heat, and from a bed ten feet by forty feet he took more than ten hundred thousand plants. The potatoes are stored soon after digging, and kept at a uniform temperature of sixty degrees. The yield in 1894 was 650 baskets of marketable tubers from an acre and 200 baskets of culls. The baskets held five-eighths of a bushel each. The receipts from four and a half acres of Sweet-potatoes in 1894 were \$433; in 1895 the crop from the same land was sold for \$650.

Mr. H. E. Van Deman, ex-United States Pomologist, was re-elected President; Mr. W. Webb, Secretary and Treasurer. The next annual meeting will be held in Milford, Delaware.

Delaware Agricultural Experiment Station.

M. H. Beckwith.

Recent Publications.

Number 6 of the third volume of the *Contributions from the United States National Herbarium* is devoted to a list of plants collected by Mr. Frederick Funston on the shores of Yakutat Bay, in Alaska, and prepared by Dr. F. V. Coville, of the Department of Agriculture. One hundred and sixty-eight species are included in the list, to which is prefixed Mr. Funston's interesting Field Report, from which it appears that *Picea Sitchensis*, the Tide-water Spruce, is the common tree of the region, growing to a height of seventy feet and extending from the level of the sea to an altitude of 2,200 feet on the slopes of Mount Tebenkof. This tree plays an important part in the economy of the Alaska Indians; with it they construct their houses and canoes; it is used in the manufacture of oil-crates, bows, arrows and other implements, and the small roots, boiled and split, are employed in basket-weaving. The Hemlock, *Tsuga Mertensiana*, is found scattered through the forest of Spruces with about the same vertical range as that tree, although it is much less abundant and of smaller size. The third conifer found by Mr. Funston in this region was a single individual of the Sitka Cypress, *Chamaecyparis Nootkensis*. The common deciduous-leaved tree is the Red Alder, *Alnus Oregona*, which Mr. Funston noticed in great quantities in the forest region, especially on the edges of open glades, along the banks of streams and on the mountain sides, where it ascends to higher elevations than the Spruce, extending up Mount Tebenkof eight hundred feet

higher than the Spruce and Hemlock, or to about three thousand feet, growing on these high slopes in jungles so dense as to be almost impenetrable, and constituting one of the most serious obstacles to mountain climbing.

A Blueberry, *Vaccinium ovalifolium*, a shrub four feet in height, forms a large part of the forest undergrowth near the coast. The dark purple berries, rather larger than peas, are collected in great quantities by the Indians, who use them fresh and preserve them for winter, drying the fresh berries by artificial heat. In September, immediately after the close of the fishing season, nearly all the women and children devote themselves to collecting and drying blueberries for winter. The fruit of *Rubus spectabilis*, the well-known Salmon berry of the north-west coast, ripens in August and is also an important article of food among the natives. This fruit is usually crushed in a wooden bowl and eaten with sea-oil, and is not preserved for winter use.

Notes.

Mr. James A. Pettigrew, late Superintendent of Parks in Milwaukee, has been appointed Superintendent of Parks in Brooklyn, in place of Rudolph Ulrich, who has resigned his position, the resignation dating from the first of March.

The Botanic Garden of the University of Pennsylvania is hardly more than a year old, and consisted originally of six acres of very rough land. Already a little lake takes the place of what was a gravel pit; there are bog and aquatic gardens, a rock garden, a bulb garden, an Iris garden, an herbaceous garden and a great many trees and shrubs, so that more than three thousand species are already represented. Professor J. H. Macfarlane is Director, and Alexander MacElwee the head-gardener.

The herbarium of the late John H. Redfield, of Philadelphia, which is extremely rich in Ferns from all parts of the world and in North American plants generally, containing all the sets made during the last fifty years in the western and south-western parts of the country, is to be sold by the Philadelphia Academy of Sciences, to which it was bequeathed under Mr. Redfield's will. The money derived from its sale, as well as that lately obtained from the sale of his botanical library, will form the nucleus of a Redfield fund of \$20,000 his friends hope to raise for the benefit of the Botanical Department of the Academy, which Mr. Redfield served faithfully for many years as curator.

East River Park is one of the comparatively new pleasure-grounds of this city which includes two blocks on the river, in one of the densely inhabited districts of the city between Eighty-fourth and Eighty-sixth Streets. A correspondent of *The Sun* of this city writes to say that just as soon as the improvement of the land was begun and the place grew in attractiveness the character of the neighborhood at once changed for the better, the houses became neater, cleanliness was more general, there was less dissipation, for the people now sit in the park instead of in the saloons. Altogether the change wrought in a congested neighborhood is reported as remarkable, and it furnishes a strong argument for providing more open spaces in the tenement-house districts.

Not long ago Mr. J. L. Normand, of Marksville, Louisiana, sent to this office what he considered the fruit of *Benincasa cerifera*, but which seems to be the fruit of *Sicana odorifera*, a Brazilian cucurbitaceous plant. This fruit is about a foot long, three inches in diameter, with rounded ends, of a deep crimson color and delightfully fragrant. In its natural state it does not appear to be at all edible, but Mr. Normand has made some preserved preparations which he considers worth something. *Benincasa cerifera*, the so-called White Gourd of India, is more nearly spherical, greenish in color, covered with a waxy bloom, and is used while green in making curries. If seeds of this *Sicana* are started early in pots and the plants set in rich soil after all danger of frost is over, they make a large growth in a single season. One of Mr. Normand's plants climbed, it is said, to the top of a good-sized dead tree and produced two hundred fruits, which weighed from four to six pounds each.

A few Florida oranges are included in the stock of the best fruit stores, and cost \$1.00 each. A limited quantity of Navel oranges from that state recently secured by the old retail fruit house of W. & C. Smith, on lower Broadway, is selling for from seventy-five cents to \$2.00 a dozen. Previous to the freeze in Florida a year ago last December

\$4.00 a box for grape-fruit was a high price in the wholesale markets of this city, but in view of the unusual scarcity as much as \$18.00 a box is now asked, and retail dealers are forced to sell this fruit at \$6.00 a dozen. The experiment is being made of introducing some bitter oranges from the Bahamas, to take the place of grape-fruit, the initial importation last week selling at \$2.00 a box. Selected pineapples from Havana cost fifty cents each at retail, and large smooth Cayenne pineapples from Florida, beautifully colored and with luxuriant tops, command double this price. Showy Lady-apples from Missouri bring twenty cents a dozen. Long Island Newtown pippins, mottled and brightly colored, and the green and russet Albemarle pippin from Virginia cost sixty cents a dozen for selected fruits. Pint boxes of small but well-colored strawberries from Florida cost fifty cents. The first Charleston strawberries were seen here last week.

Besides celery from this state and New Jersey, this vegetable is now supplied by some of the middle western states and California. The latter state is also sending tomatoes, the principal field-grown supplies coming from Key West, Florida, and Cuba. Smooth, even-sized and beautifully colored tomatoes from Pennsylvania hot-houses cost thirty-five cents a pound. Lettuce is coming from Louisiana in small lots, the dependence being on Florida, South Carolina and Virginia. Egg-plants, beets and string-beans also come from Florida, and new peas from the same state cost \$1.00 a half-peck. The first Florida cabbage of the season has been forwarded, but is not yet fully grown. The regular winter supply of home-grown cabbage is nearly exhausted, and that imported from Denmark now constitutes the main supply. Norfolk is sending kale and spinach, and Bermuda is contributing a variety of new crop vegetables, as potatoes, onions, carrots and beets. Asparagus from Charleston brings \$2.50 a bunch; a dozen long shoots from near-by hot-houses, and enough of a luxury to be held together by narrow ribbon, cost \$1.00, and the less crisp and fresh product from western glass houses may be had for sixty cents. Large mushrooms of uniform size and even color from Long Island forcing-houses are offered at \$1.00 a pound, some hardly less attractive costing sixty to seventy-five cents.

Beds of many colored Tulips and other gay bulbous flowers, which made gardens of the florists' windows a few weeks ago, have given way to other suggestions of approaching spring, as branches of Pussy Willow thickly set with downy catkins, and of Forsythia, the golden bells in luxuriant flowering on the nearly leafless stems. Small plants of Heaths continue to be a conspicuous offering, although many of the best plants are still in the greenhouses of cultivators and will not be seen in city stores until the Easter season. The window exhibits of florists are more than a display of stock, and in the best establishments are both tasteful and artistic. A crowded window of thickly placed plants, without reference to arrangement or color, is rare enough to impress this fact. Groups of *Cinerarias* are likely to make exasperating masses of color, but a few of these plants in the window of a store on Fifth Avenue appeared to really pleasing advantage, the bouquet-like mass of flowers set in the immense leaves. Pink and white Azaleas are among the best-flowered and most beautiful plants now seen, and *Cytisus racemosus* and the more delicate flowers and foliage of *Acacia dealbata* give the touch of yellow which seems necessary in a collection. In one window the moss-draped trunk and branches of a tree constitute the main attraction, with Orchids growing from the bark and openings, an owl and hornet's nest being added for more realistic effect. In another a great vase of Bride roses was easily the most attractive object in a collection of cut flowers, and large deep buds, the edges of the outer petals beautifully recurved, made a richer show in their ivory whiteness than any of the more brilliantly colored flowers. An exceptional stem of this particularly well-grown lot measured four feet, the average being more than two feet in length. Marie Louise violets, in bunches of fifty blossoms, command \$1.50. Tiny spikes of a dwarf mignonette, very attractive in their neat form, cost thirty-five cents a dozen, and great spikes of the same flower measuring nearly a foot in length cost fifty cents each. The brightest and showiest bits of color are made by neat little buds of Papa Gontier roses, which sell for the reasonable price of a dollar a dozen. Sprays of white and purple lilac are included in the best offerings of cut flowers. An original effect with the charm of simplicity is a window measuring, perhaps, seven by eighteen feet, the margin framed with a wire foundation fifteen inches wide, hidden with smilax and dotted with Bridesmaid roses. A mass of well-grouped Palms set back some six feet furnish the satisfying picture for this beautiful frame.

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The Surroundings of Statues and Monuments.

WE have often said that in this country the placing of outdoor statues and monuments is not properly considered. Such works cannot have their most effective exposure nor can they increase the attractiveness of their surroundings, unless they are artistically adapted to the special character and the special arrangement of neighboring objects. The effect of its environment upon the work of art, and the effect of the work upon its environment should be considered with equal care. And this care can be rightly bestowed only if the site is selected before the monument is designed. At the very least, the general character of the probable site should be thoroughly well understood in advance.

The folly of disregarding these plain truths has recently been shown by the attempt to secure a monumental statue of General Sherman for the city of Washington. Exceptionally fine sites for monuments of all kinds exist in that city; and from all accounts the models recently put on exhibition are interesting and varied in character. Yet the first thought excited in the minds of all who have examined these models seems to have been the difficulty of deciding between them, for the reason that no one had any idea where the accepted design would eventually be placed.

One of the newspapers of the city remarked that with this thought, as it inevitably arose, came "a feeling of injustice, not to the artists personally, for they all share alike in the disadvantage, but to their art itself, in asking for competitive designs without any indication of the kind of location the proposed monument is to occupy. It will readily be seen how a design of superior excellence in itself may fail of success because not so well suited to certain finally chosen surroundings as another of less merit; also that every artist was placed in a trying dilemma, whether to try to adapt his work in a blind sort of way to all possible surroundings at the sacrifice of artistic completeness and strength, or to design with a view to an imagined combined effect of statue and environment at the risk of being thrown out for want of these conditions."

Some of the competitive designs were elaborate constructions with terraces, balustrades or parapet-walls. Others showed the chief equestrian figure upon a highly wrought pedestal adorned by subordinate figures or groups; and others presented this figure in isolation upon a simple pedestal. The mere fact that, among the designs of the last-named class, the pedestals varied conspicuously in height, complicated judgment upon the intrinsic merits of the works by bringing in the question of appropriate placing. And, of course, the more elaborate the compositions were, and the more dominant their architectural elements, the greater became the importance of the matter of placing and environment.

Four of these varied compositions were eventually selected from the many. But just here an evil only too common in American practice once more has obtruded itself; that is, the decision of the distinguished sculptors who had been selected as experts to pronounce upon the merits of the models was not fully accepted by the representatives of the Army of the Tennessee, the donors of the statue. Only one of the four models which has received the honor of published preference, and the author of which has been admitted to the final competitions, was among the four which the expert jury pronounced the best. After such a bad beginning, the Committee of the Army of the Tennessee has now to decide upon the site it prefers, and to obtain official permission to use it. It is stated that this choice will be made before the four prize-takers begin to elaborate their ideas for the final competition. But it is already too late to utilize the fine artistic opportunity to the full. The committee must be confused in its selection of a site by the varying character of the four models for which it has shown its preference; and when the site is chosen more than one of the competitors will be forced to alter his idea conspicuously, or, perhaps, to recast it into a composition of an entirely different kind. This fact is made plain when we say that one of the chosen designs shows a very tall pedestal, surmounted by an equestrian statue, adorned with large reliefs and surrounded by allegorical figures, all raised upon an elaborate architectural base, while another shows a much lower pedestal with an exedra behind it; that is to say, one of these two monuments should be equally conspicuous from all points of view, while the other should be so set that the front view would be much more important than any other.

The proper method of procedure in a case like this would have been to choose a site at the very outset, after consulting with the experts who were to judge the models in regard to the general character which would be desirable for the monument itself. Thus, an intelligent choice among varying sites could have been made, and, on the other hand, the artist would have had a definite, or, at least, general idea to work upon. Or, still better, in a city where monumental sites are so fine and so diverse as they are in Washington, two or three sites of different sorts might have been chosen, with the understanding that it was open to each competitor to decide for which one he would prepare his design, and that his design would then be judged upon its intrinsic merits, as adapted to that special situation and no other. Thus the danger of possible loss through the checking of some fine idea by too narrow a limitation of opportunity would have been avoided, and yet the sculptors would not have been obliged to adapt their work "in a blind sort of way to all possible surroundings at the sacrifice of artistic completeness and strength," or else "to design with a view to an imagined combined effect of statue and environment" which it might prove impossible to realize in fact.

When it comes to a decision between the merits of works offered in competition, as little as possible should lie in the scale besides the intrinsic excellence of the respective models. And this state of things can be brought about only if the competitors have in advance a clear idea with regard to the special site, or, at least, the special kind of site for which their work is desired.

Rate of Growth of the Long-leaf Pine.

THE rate of growth of the Long-leaf Pine, *Pinus palustris*, given in the accompanying table, is based upon the measurements of sixty-five trees from various stations within its range. The measurements of the individual trees were extended enough to enable the Division of Forestry, with a sufficient number of properly selected trees, say, from 400 to 500 of a species, to make a complete investigation regarding its growth and progressive development. But while the biological laws of this species cannot be determined until a greater number of trees is examined, the rate of growth may be more or less clearly demonstrated by the analysis of the individuals already measured.

HEIGHT GROWTH.—The growth in height of Long-leaf Pine is comparatively slow for the first four or five years (about three or four inches); for the next two or three years the height growth has not been fully investigated, though it is also said to be slow. The most rapid stage of height growth begins with the seventh or eighth year, and continues to the 30th or 35th year, and amounts to from 16 to 17 inches annually. A tree 30 or 35 years old is from 37 to 44 feet high. From the 30th to the 50th year the annual growth in height begins to lessen, and is not more than 12 inches. A tree 50 years old is from 56 to 60 feet high. From the 50th to the 80th year the height growth rapidly decreases to about six inches annually, and grows less and less up to the age of from 90 to 100 years, when the tree reaches its full height growth—that is, from 76 to 80 feet. That Long-leaf Pine actually reaches about its full height in from 90 to 100 years is easily learned from the measurements of old trees which in from 225 to 300 years reach a total height not exceeding 108 to 118 feet.

DIAMETER GROWTH.—The diameter accretion of Long-leaf Pine is rapid for the first 30 years, when its trunk thickens by 1.6 inches (bark excluded) for each decade. For the next 50 years there is noticed a slight decrease in the diameter accretion, and for each decade only 1.4 inch is produced. A tree 80 years old at breast-height is 13 inches in diameter, including bark; this decrease of diameter accretion continues with age, being 1.2 inches for each decade between 80 and 100 years, 0.9 of an inch between 100 and 120, and 0.8 of an inch between 120 and 140 years. From the 140th year the diameter accretion falls very rapidly, its increase not exceeding 0.3 to 0.4 of an inch for each of the successive decades.

While the diameter accretion decreases with age—that is, while the rings become narrower from the centre of the tree to its periphery—the areas formed by them on the cross-sections, excluding the 20 central rings, are almost equal for the third, fourth, fifth and sixth decades. With the seventh decade, though, there is an increase of the areas, compared with those of the previous years; that increase is almost the same for the successive decades up to 140 years inclusive. Thus, dividing the time of the diameter growth into two periods, the areas of every 10 rings on the cross-section are almost equal within the limits of each period. It will be readily understood that each ring must be thinner with the increase of diameter.

MASS ACCRETION.—Speaking of mass accretion, it will be more convenient to consider separately the annual increase of the volume of a tree and that for certain periods. We distinguish two kinds of annual accretion: one, an average annual increase of the mass, produced for the total age of tree, which can be easily obtained by dividing the volume of the tree by its age. The other, called current accretion, is simply the increase of volume of a tree for a given year of its age.

From the table given below it will be seen that both current and average annual accretions, being scarcely perceptible for the first years, become gradually larger and larger till they reach their maximum point, and, remaining at those points for a couple of years, begin to decrease first, gradually and slowly, then rapidly. It will be seen, also, that while the current accretion, passing its culmination

point, becomes smaller and smaller, the average annual accretion still increases, approaching the maximum and becomes almost equal to the current accretion when the tree is between 160 and 170 years of age. The age of a tree, when its average annual accretion becomes equal to the current accretion, is equal to that of the maximum point of the average annual accretion. The same is true with regard to all species.* The difference will be only in the age at which different species reach the stage of maximum growth. It depends a great deal upon the conditions under which the species is growing—that is, soil, moisture, climatic and forestry conditions. Thus the correlation between the current and average annual accretion is of great economical value, for it determines the time when a species reaches the stage of its maximum growth. The rotation for Long-leaf Pine, should it depend on the stage of maximum growth, would lie between 160 and 170 years.

RATE OF GROWTH OF THE LONG-LEAF PINE.
(Published in advance by permission of the Division of Forestry.)

Age.	Diameter with bark (breast-high).		Length of timber with upper diameter of five inches.	Height of tree.	Volume.		Periodical accretion.						Average annual accretion.	Current accretion.
					Tree.	Log.	Decade.	Diameter.	Height.	Area of cross-section.	Volume.			
	Ins.	Feet.	Feet.	Cubic feet.	Cubic feet.		Ins.	Feet.	Sq're feet.	Cubic feet.	Cub. feet.	Cub. feet.		
10	2.1		9	0.12		1st	1.4	9	0.01	0.12	0.01	0.01		
20	3.8		23	1.20		2d	1.8	14	0.04	1.08	0.06	0.11		
30	5.5		37	3.35		3d	1.6	14	0.07	2.15	0.11	0.21		
40	7.0	16	48	7.06	5.61	4th	1.2	11	0.08	3.71	0.18	0.37		
50	8.1	24	56	10.75	9.30	5th	1.2	8	0.08	3.69	0.21	0.37		
60	9.6	34	62	15.26	13.99	6th	1.4	6	0.12	4.51	0.25	0.45		
70	11.5	44	67	24.16	23.11	7th	1.6	5	0.17	8.90	0.35	0.89		
80	13.0	52	72	33.18	32.27	8th	1.6	5	0.19	9.02	0.41	0.90		
90	14.5	56	76	43.57	42.66	9th	1.2	4	0.16	10.39	0.48	1.04		
100	16.0	60	80	55.85	54.94	10th	1.2	4	0.17	12.28	0.56	1.23		
120	18.0	65	87	76.87	75.87	11th								
						12th	1.8	7	0.30	21.02	0.64	1.05		
140	19.5	72	93	96.44	95.49	13th								
						14th	1.6	6	0.29	19.62	0.69	0.98		
160	20.5	80	98	112.3	111.5	15th								
						16th	0.8	5	0.16	15.86	0.70	0.79		
180	21.3	85	103	122.0	121.2	17th								
						18th	0.7	5	0.12	10.7	0.67	0.53		

But in fixing the rotation there ought to be taken into consideration the so-called stage of maximum value—that is, the stage when a cubic foot in the tree has its greatest value. For instance, one cubic foot in a tree 160 years old is worth \$0.05; the same cubic foot in the same tree when it is 180 years old will be worth \$0.07. With age the tree increases not only its mass, but also the value of the mass laid up previously, because the boards made from the oldest tree, being of a larger size, will bring a larger price. For Long-leaf Pine under the conditions of its present growth a rotation of 200 years is suggested as being the most economical that can be adopted.

In the table is shown the increase of volume for every ten years; we call it periodical accretion. A close examination of the figures given will give an idea as to the rate of volume growth of Long-leaf Pine.

Quite different would be the case under forestry management. In our records of tree measurements there are two whose environments in the forest are the same as those that would take place under management. Tree No. 314 (see table below), fifty-three years old, is from a moderately dense forest, the crowns of the trees being equally closed from all sides, thus forming a favorable roof-cover for that age. A Long-leaf Pine up to 90 to 100 years—that is, when it has reached its full height—being surrounded by neighbors of the same age—is competing with them for

* A mathematical proof of this law is given by Eger in *Allg. Forst und Jagdzeitung* for 1842, p. 175. Another, by means of calculus, is found there for 1870, p. 482.

light, and thus striving to increase its height growth, to be the first in stretching out its crown and to be the first in attaining the end of its biological destination to bear seeds. The trees are increasing their height vigorously, the trunks are regular in shape, clear of limbs, straight, and their diameter is not decreased so rapidly in proportion to the height. The forester will maintain the full cover in order to get all the advantages of the serviceable struggle among the individuals until they reach their full height. Then he should break the roof cover to give perfect freedom to the crowns, and to get all the light possible, which will increase the width of the annual ring, and thus the volume of tree. Tree No. 309, 140 years old, and tree No. 19, 149 years old, have perfectly free crowns and stand, as the record states, in the open forest. That would be exactly the condition under which they would be placed in a properly managed forest.

The following are the measurements of these trees:

No.	Age.	Diam.	Height.		Volume.		Accretion.	
			Tree.	Log.	Tree.	Log.	Average Annual.	Current.
314	53	12.5	60	35	19.96	17.84	0.37	0.42
309	149	25.5	102	86	142.18	141.13	0.99	2.40
19	160	25.5	111	83	176.96	170.23	1.11	2.12

Comparing these figures with those given in the table it will be seen that while Long-leaf Pine, under its present conditions, is not of much value when it is fifty years old, producing only four cubic feet in a log twenty-four feet long and eight inches in diameter; the same Pine, properly situated, would produce four times as much in a log thirty-five feet long with twelve and one-half inches in diameter. Not only would it grow well, giving an average annual accretion of 0.37, instead of 0.21 cubic feet, but it also promises to be thrifty in the future, for the current accretion is 0.42 instead of 0.37. The difference in the rate of growth will be more appreciated when compared at the age of 140 to 160 years. While a tree in a dense forest forms a log of 67 to 82 cubic feet, in the open forest the tree produces 148 to 177 cubic feet in a log of a larger size; while the 140-year-old tree, with deficiency of light, increases its volume for the next twenty years 16 cubic feet; the same tree with plenty of light in eleven years gives an increase of 36 to 37 cubic feet. This shows plainly that Long-leaf Pine in its rate of growth is very sensitive to light conditions. That Long-leaf Pine is a light-needing species may be also shown by the measurements of trees growing under shade and cover of neighboring trees. In the tree records there are such trees noted 70 to 120 years old with a total volume not exceeding 4 to 8 cubic feet.

It is left to the reader to draw his own conclusions as to what would be the profit to the southern states should the Long-leaf Pine be placed under forestry management in that section.

Washington, D. C.

A. K. Mlodziansky.

A Botanical Journey in Texas.—II.

CONTINUING our journey up the Rio Grande, late in the afternoon we reached Shumla, a railway station about three miles beyond the Pecos River, but much nearer the Rio Grande. Early in the morning of the next day, equipped for a botanical ramble, I visited the Pecos River, a long stream extending from its junction with the Rio Grande through Texas and nearly across New Mexico. In years of rain it is a large stream. The railway bridge across the river at this point is a marvel of engineering science, being the highest bridge in North America. Its extreme length is twenty-one hundred and eighty feet, and it is three hundred and twenty-one feet high. The river here is very narrow, as is the bottom of the cañon through which it flows, and the bridge practically spans the entire valley. The extreme height of the bridge is so great that it appears too light and airy to support even its own weight, much

less the weight of the heavily loaded trains that cross it. A narrow winding path leads down the left bank of the cañon to the river, and it is only when the visitor reaches the bottom of the cañon that he realizes the great height and magnitude of the bridge.

The vicinity of Shumla proved a good locality for botanizing. The bluffs adjoining the Pecos are, perhaps, as much as any portion of western Texas, a favorite haunt of the Resurrection Plant, Bird's Nest, or, as Mexicans call it, Siempre vive, the *Selaginella lepidophylla* of botanists. Individual plants everywhere on the bluffs crowd their neighbors and car-loads of them could now be gathered, and, perhaps, have been gathered here. This species is remarkable for the plan that it has devised to save itself from dying of thirst. Its broad lacinate leaves, which in wet times are completely spread and prostrate, as dry weather comes on coil themselves so tightly that their upper faces remain fresh and green, while their lower faces become faded and dry, giving to the plant the appearance of a rounded dead mass of vegetation, something like a small bird's nest. The plant is not dead, but sleeping, and when the rains come, or when immersed in water, it quickly revives and opens its green surfaces to air and sun. The plant roots deeply in the crevices of rocks, so that it requires the use of a trowel, or several vigorous kicks from a stout shoe, to loosen its hold.

Sotol, *Dasyliroton Texanum*, the great native forage plant of this region, is common on the high mesas and mountain sides. It becomes five to eight or more feet tall, with two or three feet of the upper portion of its stems covered with greenish liliaceous flowers. Domestic animals could hardly subsist here without this provision for their wants by nature. They eat, in the winter, the cabbage-like head which this plant forms in the late summer to protect the growth and inflorescence of the coming year. Agave heteracantha, the Lechuguilla of Mexicans, is common from Devil River to New Mexico. Its thick and radical leaves are serrated with ugly curved spines. There are several species of Agave growing in western Texas and in New Mexico, more species, probably, than have been allowed. They differ principally in the arrangement and color of their flowers and in the size and form of their fruits. There appear to be two species with bright yellow flowers. The genus needs a thorough revision by a master workman, but only after a year or more of careful collection and study of the species as found in Texas, Mexico and New Mexico. The common Century Plant grows naturally in the lower Rio Grande region of Texas, though I have never seen it credited to that state.

The most conspicuous and, perhaps, the most remarkable shrub growing upon the mesas of western Texas is St. Jacob's Staff, Candle Wood, Ocotillo, *Fouquieria splendens*. It is a tall shrub, more nearly related to *Tamarix Gallica* than to any other native or naturalized shrub of Texas. It usually branches from the base or near it. The stems are strict and thickly armed from the base to the summit with pairs of strong spines, from whose axils fascicles of thick roundish leaves proceed. The structure of the stems is largely cellular, but the outer portion of them is woody, dense and hard. The bases of the spines appear to arise in the cellular part, leaving the wood full of holes in their decay, apparently upon the plan on which *Opuntia frutescens* forms its wood. The bright scarlet flowers are borne in long terminal racemes. When in full bloom it is certainly one of the most attractive of Texas shrubs. Though I have seen thousands of individuals of the species, yet none of them were "almost leafless," as we are told that all of them are. Perhaps they may become so later in the season. Mexicans use the stems of this shrub for fence palings. They sometimes grow and make a living fence. The species is common from Devil River to New Mexico.

It may be said in commendation of the plants of this arid region of the country that they appear to have carefully studied the conditions under which they live, and have well

learned the art of self-preservation; and they have not only lived, but also have found time to make their flowers attractive by their beauty, and often fragrance. *Selaginella rupestris* grows on damp rocks near the river. It is over most of Texas and common in some of its numerous forms. Close by the bridge I found a fine *Lucæna*. It was already in fruit, with long pods nearly grown. Low species of *Dalea* are common on the hillsides, and *Hoffmannseggias* make pleasant company for them. There are more and handsomer species of those genera of the Pea family along this route than I have met before. Later in the day a visit was made to the near-by Rio Grande. The cañon of that river here is deep and narrow—its walls of rocks so rough and precipitous that a descent to the river was impracticable. But the rains had brought nearly all the vegetation into growth that is ever seen here, and rare and peculiar plants invited an examination of their varied attractions. Ferns were abundant on the shaded sides of the great rocks; the species were about equally divided between *Cheilanthes* and *Pellæa*. A form of small Oak with sinuate spinose leaves was common in the ravines. The crowning glory of the hills from Nueces River to the Pecos in the early days of June is *Leucophyllum Texanum*. It is now in full flower, and its great profusion of light purple bloom literally gives to the hills their own hue.

The Pecan-tree is said to grow upon the upper waters of Devil River, which is its most western Texas limit. In order to keep up its popularity the Pecan has developed a new and valuable variety with a very thin shell. It would seem that in this variety Nature had exhausted her powers in nut-making. The variety is known as Paper-shelled Pecan.

Pin Clover, *Erodium cicutarium*, a forage plant of some renown, is rarely to be seen in Texas. Here it has to shirk for itself, no attention being paid to it as a cultivated plant, so it is very slow in getting a foothold. *Xanthium spinosum*, a Clotbur, armed with cruel spines, is liable to become a great nuisance throughout the entire central portion of the United States. As yet it is very rare in Texas, but if it is allowed to gain a hold on farms it will have no successful rival unless it be the Russian Thistle, *Salsola*; and a man or a beast of good sense would prefer to walk through a field of Russian Thistles rather than through a field of spiny Clotburs.

Machæranthera tanacetifolia is not uncommon in the region which we are traversing. It is now a handsome low-growing Aster with Tansy-like leaves and typically purple flowers. A form with white flowers is frequent. One with rose-colored flowers is rarer. Along Big Creek, near Hays City, Kansas, I found a station where Nature herself had massed the three colors into a miniature parterre of great beauty. The species is sometimes seen under cultivation in gardens, and there are few handsomer native composites.

Nothing of value has been added to botanical knowledge or classification by subordinating the genus *Machæranthera* or the genus *Diplopappus* to the Aster, a genus already large and unwieldy. The species of either of the degraded genera are less liable to be confounded with species of Aster than are species of *Erigeron* and of a half dozen other genera which, as well as they, might suffer. A plant already located, without great reason for a change, should be allowed to remain in its place, though it might as well have been placed elsewhere. That which in science is established should not without great cause be changed, and only then upon the verdict of a competent jury after a fair trial of each case upon its merits.

Several species of Wild Flax (*Linum*) grow in western Texas, and the cultivated plant is becoming established along most of the railways of the state. From its associations with the dawning of our civilizations we all are to see the venerable old species everywhere. The cultivation of Flax and the manufacture of linen from the tough fibres of its bark began in prehistoric times. Linen was doubt-

less the first plant product used, next to Fig-leaves, for apparel by the human race.

Gaillardia suavis is sometimes to be seen in western Texas, though commoner farther eastward. Here it usually furnishes its flowers with insignificant rays, and wears a very different general habit from the rayless forms of the species as seen in Kansas.

Before leaving Del Rio, apricots, peaches, plums and green corn of roasting size were on sale in that city, all raised on irrigated lands.

La Junta, Colo.

E. N. Plank.

Plant Notes.

Clematis paniculata.

WE have already published a figure of this plant (vol. iii, p. 621), as well as the reproduction of a photograph showing a plant four years old from seed (vol. v., p. 91), but no apology is needed for the accompanying illustration of a plant on the grounds of Henry S. Hunnewell, Esq., Wellesley, Massachusetts. This beautiful climber was discovered in Japan about 120 years ago by Thunberg, and it is said to have been introduced a hundred years ago into European gardens. It was probably first sent to this country by Thomas Hogg, and was established in the Parsons' nurseries, at Flushing, thirty years ago. It was so rarely seen in cultivation that it was practically unknown until 1889, when mention of it was first made in this journal. Why it was not more rapidly disseminated can hardly be understood, except that sometimes its seed fails to ripen in the autumn, and, in any event, it germinates slowly. When planted in the spring the great proportion of it does not come up until the second year, a habit which it has in common with many other species of this family. It grows rapidly, however, when once started and makes strong plants, so that it remains a matter of surprise that so little was known of it until it was discovered how readily the plant can be grafted on our native *Clematis Virginiana*, and still better on *C. stans*. It ought to be said that the root-stock is only needed to sustain the plant in its infancy, for the base of the graft should always be set beneath the soil, where it will soon throw out strong thick roots of its own to supersede the parent root. Time is in this way saved by grafting, although, when well-ripened seed is sown in autumn in a box and wintered in a cold frame, the plants will appear the following spring and will bloom at two years old.

We have already described this *Clematis* so often that little needs to be said about it, and, indeed, it has now become so common that almost every one who takes any interest in garden plants is familiar with its character. It is perfectly hardy, although part of it is killed back every winter, and, indeed, it grows more strongly and is better furnished at the base when cut back hard every spring. Shoots starting from the ground when the roots are in deep rich soil will often grow twenty feet in a single season. In this respect the plant resembles *Clematis flammula*. It differs from *C. flammula*, however, in having comparatively large leathery leaves and in producing flowers in long axillary panicles. The individual flowers are an inch or more across and carried in such wild luxuriance that the foliage is entirely covered during the first half of the month of September in this latitude. The flowers are followed by heads of fruits which turn to a clear red, each one with a long silvery tail, so that these feathery tufts seem to hover over the leaves, which persist all through autumn, usually as green as they are in midsummer, but sometimes changing to copper-color and afterward to a dull bronze. The flowers have a distinct fragrance, which is likened by some to that of Hawthorn and by others to that of Hyacinth. Altogether, this vigorous, floriferous and long-lived Asiatic climber is one of the very best for porches or screens, while in parks, large grounds and along roadsides it might well be used, like our own Virgin's Bower, to clamber over shrubbery and drape them with its long stems covered with myriads of white star-shaped flowers.



Fig. 8 —*Clematis paniculata* in a Massachusetts Garden.—See page 74.

IPOMŒA BRIGGSII.—This species has been in full flower for several weeks in one of the conservatories of the Botanical Garden in Washington. As grown there Mr. Oliver describes it as very showy, resembling somewhat the well-known *Ipomœa Horsfalliæ*. It has a more profuse growth, however, than that species and bears double cymes of flowers in the axils of the leaves. The color of the flower is unlike that of any other known species of *Ipomœa*. It is described as a rich magenta-crimson, but the color varies in depth in different parts of the corolla and in different flowers. The tube is about two inches in length, and this expands to a diameter of two inches. The Washington plant is growing in a ten-inch pot, and, judging from the number of open flowers and buds, it is wonderfully floriferous, each leaf on the strong shoots having a cluster of flowers springing from its axil. If it will grow and flower outside as satisfactorily as it does inside it will be a valuable addition to our list of summer-flowering vines.

Cultural Department.

Notes on Begonias.

BEGONIA PHYLLOMANIACA is, perhaps, the most interesting species in the genus. The striking peculiarity of this plant is that it produces from its stems and petioles innumerable viviparous buds or young growths, which make young plants, if taken off and inserted in sand. It is an upright-growing plant, with succulent, hairy, green stems; eight or nine inches is about the length of the leaves and they are of a light green color. In shape they are obliquely cordate, attenuated, slightly lacinated and fringed. The pale rose flowers, which are produced in axillary cymes, rise slightly above the foliage. They measure about one inch across, are not very showy, but make a pleasing contrast at this time with the green foliage. It comes from Brazil and does best here when grown in a cool greenhouse during the summer months, and in the winter it thrives in a temperature ranging from fifty-five to sixty degrees, Fahrenheit.

Begonia Verschaffeltiana is a splendid winter-flowering plant and is now a mass of flowers. It is a large, strong grower and needs rich soil to develop its large cymes of flowers. In a deep, roomy pan we place three or four plants, which make an effective display while in bloom. In early summer they are turned out of the pans, the exhausted soil removed from the roots, and each plant or stem is then planted separately in the garden. By fall they make large healthy plants, and when the nights begin to cool they are lifted and put back into pans again. When replanted in the pans three or four plants about the same size should be selected, so that they will grow together evenly. If the plants get leggy they can be cut right below the thick head of leaves and inserted in sand in the propagating bed, where they make roots in a short time. This *Begonia* is a hybrid between *B. corolinæfolia* and *B. manicata*. It has large succulent stems clad with large ovate acutely lobed leaves, which have long green petioles. The flowers are in large showy cymes and raised well above the foliage on long stout peduncles.

The flowers of *Begonia sanguinea* are not showy, but it has handsome leaves and makes a good foliage plant when treated properly. It has erect red stems which are slightly woody at the base and are well covered with leaves from four to six inches long and sometimes longer. They are subpeltate, obliquely cordate, succulent, shining bright green above and deep red below. The plant is in bloom now and the red peduncles are nearly a foot long, carrying small white flowers produced in branching cymes. Young shoots are easily rooted in spring, and if they are potted on during the summer as they require it, by early winter they will make handsome plants. They are grown in the greenhouse during the summer as they make better foliage. If they are planted in the garden care should be taken when lifting them in the fall that the leaves are not torn, as this disfigures the plants.

Begonia peltata is a handsome foliage plant, introduced from Brazil in 1815. What makes the plant so distinct and easily recognized is that its stems, leaves and petioles are completely covered with a soft silvery tomentum. It makes a good stove foliage plant and has a very uncommon silvery color. When well grown it has large peltate, ovate acuminate, thick and fleshy leaves nearly a foot long. The small white flowers are produced at this season in cymes on tall erect peduncles. It

is not as free-growing as many *Begonias*, but with careful cultivation it can be grown into a handsome specimen.

Botanic Garden, Harvard University.

R. Cameron.

Dipladenias.

EACH recurring season reminds us of the value of these Brazilian climbing plants for the greenhouse, and there is a possibility of their soon becoming much used for planting outdoors in summer, since there is every reason to believe that they will be as well adapted for this purpose as for indoor use. Full sunshine is indispensable and rain will not injure the blooms, and in a warm position, with light soil, they will be sure to succeed. We have a batch of seedlings from seed saved last year, and as some of the plants have already bloomed we look forward to seeing them all flower during the coming season. Seeds are not often produced in this genus, but I have personal knowledge of three instances where it has been secured and plants raised from it. It is also an easy matter to propagate *Dipladenias* from cuttings of one or two joints each, made from well-ripened growth. When rooted they must not be potted in material that will become impacted. We use nothing but fern-root fibre to grow them in. With this it is impossible to overwater the plants, and it holds enough moisture in suspension to satisfy their needs. We use manure-water when the plants are in active growth and bloom. Loam in the soil has been the cause of more failures than anything else. It is necessary to grow the plants in full sunshine, even in the hottest summer months, and plenty of water should be used to spray with, as insects are liable to increase rapidly if they once get a foothold. It used to be considered indispensable to keep *Dipladenias* in a warm house at all seasons, especially when at rest in winter; the temperature of the Rose-house in summer for daytime, and fifty degrees, Fahrenheit, during night in winter, is best suited to them. It is difficult to imagine a prettier sight than a low span-roofed house with the roof covered with *Dipladenias*. The sprays of bright pink flowers shade off to crimson as they get older, the same sprays blooming continually from May until November. The growth of *Dipladenias* is not so rampant as is that of most tropical climbers, and is easily kept within reasonable limits. Last summer Roses were grown successfully in the benches underneath, and there are positions in every greenhouse where these plants would do well. We grow *D. profusa*, *D. amabilis* and *D. Brearleyana*, all of which are good, the latter the richest-colored and largest-flowered of all. We cut the plants back at the close of the blooming period each winter, when they go to rest naturally, and keep them drier until they show signs of starting again at about this time. They are then repotted in pots or pans a size larger. At potting time it will be seen that these plants have large tuberous roots, not unlike *Dahlia* roots in shape, but more woody. These are the reservoirs of vitality and are easily injured, but if handled carefully there need be no check to the plants. Water should be applied with great care until active growth begins in the warm spring months. When the plants are grown in full exposure to the sun in an unshaded house, the pots containing the plants ought to be shaded by a layer of moss or other non-conducting material to prevent injury to the roots from the heat. We also put a layer of moss on the surface of the potting material in hot weather to show the condition as to moisture, and find this beneficial.

South Lancaster, Mass.

E. O. Orpet.

Notes on Geraniums.

IT may safely be said that the common *Geranium*, hybrids of *Pelargonium zonale* and other species, is the most popular exotic plant under cultivation. Through all the changes in popular fancy and through all the ridicule heaped upon bedding plants in general, the *Geranium* almost alone has been spared. Few plants have so many good qualities and are in so many ways fitted for the amateur and the novice. *Geraniums* are almost entirely free from disease and are very seldom troubled with insect pests. With common garden-soil, sunshine during the middle of the day and the temperature of an ordinary living-room, one can hardly fail to have them bloom all winter long, and, in fact, they are the brightest of window-plants everywhere. The only practicable danger is the tendency to overwater during the earlier winter months. It is safer always to err on the side of too little than too much.

Wherever bedding plants are used they are indispensable, and usually most effective when planted in masses, and scarcely less so when the free-blooming green-leaved varieties are edged with the variegated forms. They rarely com-

bine well with other plants, and are generally seen at their worst when associated with Coleus. I call to mind, however, an effective bed at Kew, where *Verbena venusta*, one of the erect-growing, purple-flowered species, had been planted among the silver-leaved *Geraniums*.

The types are scarcely recognizable in the many superb varieties we now see. One of the parents, *Pelargonium inquinans*, a species of erect habit, zoneless leaves and compact umbels of short, round-petaled, scarlet flowers, is more nearly exemplified in the variety known as General Grant than in any other cultivated variety I know. *P. zonale* is the other species, and this is characterized by shorter-jointed growth, more diverse habit and less compact umbels of longer-petaled pinkish flowers. It is probable that other species have entered into the parentage of the many florists' varieties, and even so, it is hard to see how so many fine crimson and salmon-colored varieties could have originated.

Geraniums flower freely when given generous treatment, and, however grown, are attractive in appearance. They are not now grown into specimen plants so generally as they used to be. Many years ago it was customary to accord them a year's special treatment, and many old gardeners do this now. During this time they were not allowed to bloom. Plants intended for specimens are grown from cuttings taken in the autumn. During the next year they are tied out, stopped and otherwise trained into the desired form. A good foundation of short, well-ripened growth is made during the summer, and for the winter the plants are rested in a cool house on shelves near the glass. With the lengthening days of spring it would almost be impossible to keep them from blooming if this were desired. The immense quantity of flowers such plants will produce is surprising to people unfamiliar with this treatment. A gorgeous setting of these well-trained specimens is always an attractive feature in the floral display in the tent near Mr. H. H. Hunnewell's residence at Wellesley, Massachusetts, during the early spring months.

Ivy-leaved *Geraniums*, forms of *Pelargonium peltatum*, have increased in popularity during recent years, owing mainly to the introduction of some fine double varieties. Generally double *Geraniums*, especially among the *Zonale* type, are not considered as handsome as the single varieties, but they are more serviceable for cutting. The double Ivy-leaved varieties rival in beauty the double *Zonals*. The stems are longer, the flowers larger, more double and more delicately colored, mostly in rose and scarlet shades, and the individual flowers on some recent importations measure fully one inch across. Owing to their prostrate habit, Ivy-leaved varieties are well adapted for hanging baskets, and several of these formed an interesting feature of the display above alluded to. But after the brightness of the Zonal display had departed, and the plants had been removed to undergo another summer's preparatory treatment these Ivy-leaved varieties bloomed on in good condition for nearly the whole summer.

Wellesley, Mass.

T. D. Hatfield.

Cypripedium insigne.—This popular Lady's-slipper is one of the best Orchids of the present season. Very floriferous, it is seen in a great number of varieties of a more or less bright yellow color, with the dorsal sepal marked with brighter or fainter black or maroon spots, and more or less white on the upper half. The foliage is always bright green and quite attractive. This species is the parent of innumerable hybrids and varieties which all bear a resemblance to the type. Some are rare and costly, but, perhaps, of no higher ornamental value than the species itself, which is now as cheap as a good *Begonia* or *Cyclamen*. This Orchid can be grown by anybody in a warm apartment or greenhouse. It thrives well in a mixture of peat and sphagnum-moss in well-drained pots. Occasional watering with liquid-manure is very beneficial. Light sprayings of the foliage in summer and a pure and warm atmosphere are essential to success. In December or January the flowers expand and keep in perfect condition for months.

Newark, N. J.

N. J. R.

Jatropha hastata.—This is a curious and interesting stove plant. The stem is somewhat pear-shaped, being much more swollen toward the base than the top, and it seldom branches. The leaves are few in number, usually not more than four or five, and arranged alternately round the upper end of the stem; they are hastate, as the specific name implies, and lobed with from three to five lobes. The leaf-stalks are about five inches long, and the blade is rather larger than the palm of the hand. The plant is deciduous and generally loses its leaves in December. On the stem between the leaf-stalks are what appear to be undeveloped leaves, not unlike small forked spines, which become hard with age; these and the upper

portion of the stem are covered with a sticky substance, apparently to prevent insects or ants from climbing up the flower-stalks (which rise immediately from the summit of the stem) and stealing the nectar secreted in the flowers. The flower-stalks appear early in the year and are about five inches in length; the inflorescence is corymbose. The flowers are monœcious, the pistillate flowers being borne in the axils of the forked inflorescence. The flowers are all borne on short pedicels of a bright coral color, and these are not only more beautiful than the flowers themselves, but they persist long after the flowers have fallen away. As the plant rarely branches, and the flowers are monœcious, it is somewhat difficult to propagate. Last February I used a camel's-hair brush to bring about artificial fertilization, and I succeeded in getting a pod of seed, which is just ripening. *Jatropha hastata* is a native of Cuba and belongs to the Euphorbiaceæ. It delights in a warm temperature and a soil composed of half loam and half good fibrous peat, with a little silver sand added, in well-drained pots. During the growing season plenty of moisture is needed, but when the leaves begin to mature, water should gradually be withheld and the plant allowed a season of rest.

Northampton, Mass.

Edward J. Canning.

Correspondence.

Propagating Hickories.

To the Editor of GARDEN AND FOREST:

Sir,—How shall I go to work to propagate in quantity different varieties of the Hickory—for example, some which bear remarkably large and thin-shelled nuts? I have been told that it is next to impossible to graft them.

Morristown, N. J.

S. A.

[We have referred this inquiry to Mr. Jackson Dawson, who says that although he has never tried to graft a Hickory out-of-doors, and it is true that these trees are somewhat difficult subjects, nevertheless he does not hesitate to say that with proper stock and precaution they can be as readily propagated under glass as most of the so-called difficult plants. He has experimented with most of the species, and has succeeded with all he has tried. This success with several species and varieties of Hickory has been gained without any special preparation of the stock, and, in fact, most of the time he has gone to the woods and dug up the stock after he had received the scions. Of course, this made the work still more uncertain, and yet in the worst cases he has saved twenty-five or thirty per cent. of the grafts.]

"My method," writes Mr. Dawson, "has been to side-graft, using a scion with part of the second year's wood attached, binding it firmly and covering it with damp sphagnum until the union has been made. The best time I have found for the operation under glass has been during February, and the plants have been kept under glass until midsummer and wintered the first year in a cold frame. In all genera I find certain species which may be called free stocks—that is, stocks which take grafts more readily than others. Thus, nearly all the Oaks will graft readily on *Quercus Robur*; the Birches will graft more easily on *Betula alba* than on others; so of the Hickories, observation has led me to believe that the best stock is the Bitter Nut, *Hicoria minima*. This species grows almost twice as rapidly as the common Shag-bark Hickory, and while young the cambium is quite soft. I should advise any one who wishes to propagate Hickories on a large scale to grow stock of this species in boxes not more than four inches deep. In this way all the roots can be saved and there will be no extreme tap-root, and when shaken out of the boxes the plants are easily established in pots and ready for grafting. If taken up in the ordinary way from the woods it requires almost two years to get them well-rooted, and often the stocks die for want of roots after the graft has really taken. If grown in rich soil the stocks will be large enough to use in one or two years. I should then pot them early in the fall, keeping them from heavy frosts and bringing them into the house about the first of January, and as soon as they begin to make roots I should side-graft them close to the collar and plunge them in sphagnum moss, leaving the top bud of the graft out to the air. The graft ought to be well united about the last of March, when the

plants should be taken from the sphagnum and set in the body of the house to finish their growth. After carrying them over the next winter in a cold pit they could be planted out the following spring and the second year they could be set where they are to remain, unless they are transplanted every second year."—Ed.]

Growing Lettuce under Glass.

To the Editor of GARDEN AND FOREST:

Sir,—The conditions under which Lettuce has been forced this winter have differed materially from those of the past two seasons, and a succession of almost sunless days, with damp and warm weather, has made it difficult to grow Lettuce heavy enough to count much when it comes to be weighed up for market. Prices have been the same as in recent years. We have been obliged to keep part of the steam lines on the houses and the ventilators raised partially to prevent rotting off, and even with this treatment the bottom leaves decay as soon as the plants get large enough to touch each other, and when ready for cutting the plants do not weigh more than half as much as they should.

We are using both subirrigation and surface watering in growing Lettuce, and while there is some difference in favor of subirrigation, it is not enough to pay for the extra cost of constructing the beds. We have one house, twenty-two by seventy feet, with solid benches, and two and a half inch tile laid eight inches apart crosswise of the benches, and soil about eight inches deep. The tile gives good drainage and ventilation through the bed, but the watering is all done from above. Last year in this house we grew two crops of Lettuce and one crop of Cucumbers, which sold for exactly \$400.

Adjoining this house we have another, twenty-two by seventy feet, with solid benches and cemented bottoms. The tile in this house runs lengthwise, and is connected with open troughs at the ends and centre. The soil is about the same depth as in the first house. The beds are watered by subirrigation through the tiles, the water being turned into the troughs at the two ends and centre of the house. We find this method convenient, and in dark cloudy weather it is more effective than surface watering, because the ground can be kept moist without wetting the leaves. But, as already stated, it will not pay for the extra labor and cost of constructing the benches unless there is a more marked difference than has shown thus far.

Lettuce is selling now at fourteen cents a pound in the Cleveland market. It takes two weeks longer to grow the plants to marketable size than it did last year, and then they do not weigh nearly as much. If we sell half as many dollars' worth out of our houses this winter as we did last we shall think we have done fairly well.

Lakewood, O.

F. E. Carr.

Cypripediums at Langwater Gardens.

To the Editor of GARDEN AND FOREST:

Sir,—The collection of Cypripediums in the greenhouses belonging to Mrs. F. L. Ames, of North Easton, Massachusetts, is one of the largest in the United States. Among Orchids, Cypripediums have a beauty all their own; some others are more brilliantly tinted, but are only attractive when in bloom, and even then the stems of some of them, as of many Cattleyas, are awkward, to say the least. The beautifully mottled foliage of the Cypripediums vies in attractiveness with the curiously shaped and oddly marked flowers.

This collection is rich with many hybrid forms which have been raised here. Cypripedium Jack Ames is a cross between C. Lawrenceanum and C. ciliolare. The plant is much larger than either of its parents. The foliage is particularly large and handsomely shaded in light and dark green. The prominent violet markings on the dorsal sepal are characteristic of the seed parent. The warted, or black hairy spotted, petals are characteristic of both, although in the number and distribution of the spots it more closely resembles C. ciliolare. The gem of all is the primrose-yellow C. insigne Sanderæ. Among several so-called yellow varieties this is the only one worthy the name. If there is anything to mar its beauty it is the merest trace of brown on the lower part of the dorsal sepal and a scarcely distinguishable margin of white on the upper edge. The hybrid Juno (C. Faireanum × callosum) resembles in many respects C. callosum. The curiously twisted petals characteristic of C. Faireanum are very prominent. C. Winnieanum (C. Druryi × villosum) is a handsome kind with a dark brown line along the centre of the dorsal sepal and a wide

margin of white. Orion (C. concolor × insigne), as might be expected, is a pretty hybrid with pale yellow flowers spotted with brown. Minnie Ames, a handsome dwarf hybrid between C. concolor and C. niveum, is white, suffused with purplish pink dots. In Alethro the large dorsal sepal is nearly white. The petals are recurving, violet-spotted, on a green ground. Aphrodite is between C. niveum and C. Lawrenceanum. It is distinguished by a white groundwork on the dorsal sepal, with violet lines running through and violet spotting on the other parts of the flower.

Cypripedium Niobe (C. Faireanum × Spicerianum) has the good qualities of both parents. Its foliage is beautiful, and it has the graceful recurving petals of C. Faireanum. C. Sallieri aureum (C. Villosum × insigne) was known as the yellow Cypripedium until the appearance of C. Sanderæ. It is a distinct and beautiful hybrid. It loses none of its beauty by comparison with C. Sanderæ, and would never be discarded on account of it. C. Sallieri aureum is rather orange-green than yellow, with a few dark spots on the dorsal sepal, and is white on the upper part. The rare C. Chamberlainianum is among the most beautiful and attractive of Orchids. It alone is worth going a long way to see. The type is unique. The foliage is very broad, flat and attractively variegated. The large sepal is green, with a lighter-colored margin and dark lines. The petals are long and twisted, screw-like, and deeply colored with a violet and brown metallic-like lustre. The edges of the petals are hairy. The pouch is violet, dotted with purple, with a band of orange about the mouth. The staminate node is very large and bronzy green. C. (Selenipedium) Schroderæ is the finest of its type. The whole of the flower is bright reddish pink, prettily spotted with lighter shading on the infolding lobes of the orifice of the pouch. C. Germinyanum (C. villosum × hirsutissimum) is a beautiful flowered hybrid with the purplish pink petals characteristic of C. hirsutissimum, the dorsal sepal bronzy green, with lighter shadings. C. Leeannum giganteum is the best of all the varieties of this type. The dorsal sepal is very large, and, with the exception of a line along the centre, it is white. The petals are orange-green, with lines and markings of reddish bronze. T. D. Hayward is a cross between C. Druryi and C. superbiens. The groundwork of the large sepal is white, with bright violet lines running through it, and a heavier medium line. The pouch is silvery pink, and the petals pink, with a deeper line along the centre. In C. Measuresianum the petals and pouch are both reddish bronze. The dorsal sepal is green, with deeper lines and margined with white. Creon is another beautiful hybrid. The large sepal is almost wholly purple, there being merely a narrow margin of white. C. (Selenipedium) Brysa (reticulatum × sedeni, var. candidulum) is still among the best hybrids of the New World type. The whole of the flower is white, tinted with rose. The infolding lobes of the pouch are spotted. C. Phæderæ (Lindleyanum × sedeni, var. candidulum), another of this type, is deeper in tone than Brysa. It has the vigor of C. Lindleyanum, and is also a very free bloomer. Like all the Selenipedium type, it is seldom out of flower, and there have been as many as seven flowers open at one time on one flower-stem.

Wellesley, Mass.

T. D. Hatfield.

Meetings of Societies.

The Western New York Horticultural Society.—IV.

CRIMSON CLOVER IN HORTICULTURE.

Mr. George T. Powell read a paper on this subject in which he said that this crop was attracting attention, largely because it is an annual and grows at a season when the land is otherwise unoccupied. The frequent failure of Red Clover is a discouraging feature of our agriculture. Crimson Clover germinates quickly and develops rapidly. On Mr. Powell's farm leaves had been seen forty-eight hours after the seed was sown. In Delaware and New Jersey hundreds of acres are sowed with the seed after other crops have been harvested, and in one field from which fifteen tons of tomatoes had been gathered seed was sown in September, and in January plants were dug with the roots three feet long. With Mr. Powell a block of Pear-trees where this Clover had been sown gave a much better crop than an adjoining block where there had been none. Sweet Potatoes, followed by a crop of Crimson Clover, and when planted in the same place next year, showed an increase of yield, owing, it is thought, to the plant-food gathered by this plant. As a special protection for an orchard against drought, Rye four feet high was chained and plowed under, and Crimson Clover sown on the field in July made a great growth. It is a good winter covering and mulch; it

brings valuable fertilizers to the surface as well as collects nitrogen; it checks the late growth of trees so that they will ripen their wood, and in all these ways it is a useful crop for orchards. A growth of Crimson Clover six inches high will add nitrogen to the soil which would cost \$16.00 in money. A growth thirteen inches high will add \$25.00 worth of the same plant-food to an acre. Where this Clover fails the cause is usually poor seed.

IRRIGATION IN FRUIT CULTURE.

Although the artificial application of water has been practiced for some time in our western states, it has not been considered heretofore essential to fruit culture in the east. But Mr. Hale, in an interesting address, argued that an extra water-supply would be necessary in the horticulture of the future in the eastern states. The cultivation of fruits requires careful labor; much capital has been invested in plants and plantations, with facilities for handling, and the grower ought to go a step farther and insure his crop. Mr. Hale had lost half a crop by drought many times. A neighbor of his had invested \$800 in a dam and reservoir, seventy feet above his fruit garden, and had applied water at the rate of one inch a week for three weeks, and thereby increased his product in quantity 150 per cent., while it was of much better quality, so that while the abundant berries on the irrigated land brought eleven cents a basket, the smaller crop on the other land was bringing but nine cents. The increased value of his fruit on three acres paid in one year the cost of his plant. Another neighbor ran a stream through open ditches and doubled his product on an average of nine years, although there was only one severe drought during the time. Last year was a dry one in Connecticut, but on the first of August there came three inches of rain at the home farm, with not a drop at the other orchard. The result was that sixty per cent. of the fruit in the home orchard was classed as extra, while only twenty per cent. in the other orchard reached that grade. In the home orchard twenty-eight per cent. only was in the second-best grade, while forty per cent. was in the second grade in the dry orchard, the remainder in both being of two lower grades. This one shower made a gain in the home orchard of from \$1,200 to \$1,500. Mr. Hale has planned to irrigate his farm by putting in a six-inch pipe from a spring-fed reservoir on high ground and a four-inch pipe farther down. The farm is like most of those in the Connecticut valley, long and narrow, sloping back from the river, and the pipe has been laid along the contours of the highest ground, with a hydrant every two hundred feet. He has not devised completely a scheme for distributing the water, but he is sure this can easily be done, and he thinks there is not one farm in ten where water cannot be secured for irrigation at an expense which would be met by the increased product. A man near Pittsfield, Massachusetts, buys water from the city at ten cents a thousand gallons, and has put in a pipe to distribute it. He has no doubt that it will pay a good dividend on grass crops, and much more on fruit. It is just possible that the fruit may be of lower quality, but that is by no means certain, but certainly it would be larger, more beautiful and more salable. Windmills are too uncertain, because when water is wanted it is wanted badly. Steam power is used on some farms near Boston, and Mr. Hale believes that if eastern men who have put their money in western irrigation plants had invested it at home it would have yielded a rich return.

NEW STRAWBERRY CULTURE.

Mr. L. J. Farmer explained the great change in the methods of growing Strawberries during the last ten years. In fertilizers we are now using large quantities of potash and phosphoric acid and less nitrogen. In transportation we use light cheap crates as gift packages. In the actual cultivation we have made less progress, and there is still too much hand labor. The old way was to set the plants early and cultivate all the season. The new way is to take up the plants at the usual time, trench them in and then transplant to the field about the first of June. The trench is made deep by the plow and the plants are set against the landside, twenty-four to the foot, and left until set out. The rest of the soil is worked deep until planting-time, so that the white grubs are turned up for the birds and the weeds are killed. The plants are sprayed the first season, as can easily be done in this close row, and should be done every week. If planted in ground that has not been affected by old beds they will need no further treatment. He wets the plants before moving them; takes abundant earth with the roots, and they keep right on growing. In transplanting it is not necessary to pinch off the leaves, as the plants are like potted plants, only better. In the field the rows are five feet apart and the plants a foot apart in the row. If confined to one berry, he would plant the Parker Earle.

NUT CULTURE.

There is much encouragement to plant our native nuts and some of the foreign ones. As a rule, our indigenous trees are good bearers, and, in Mr. Van Deman's opinion, they produce nuts of better quality than foreign ones. The Chestnut is receiving the most attention now, and there are a few well-marked native varieties of value. Although they are smaller than the European varieties, they are of better quality and very productive. The best are Delaney, Excelsior, Griffin, Hathaway, Morrell and Otto. Rocky hillsides and other places unsuitable for tillage can be used with profit for nut-trees, and they can be set about buildings and in pastures. The European varieties seem more profitable. It seems to be a rule that the more pubescence the nut has the better its quality. European varieties are more fuzzy than the Japanese, and less so than the American sorts. The most prominent of these are the Paragon, Numbo, Ridgely and Hannum. Japanese Chestnut-trees have a more dwarf habit, and the nut has a bitter skin. They graft quite readily on American seedlings, and the best varieties introduced are Alpha, Early Reliance, Grand and Superb. Among the Hickories the best nut-tree is the Pecan, a native of our southern states, and the Shell-bark Hickory, common throughout the north-eastern states. A firm in Pennsylvania ships more than twenty tons of hickory nuts every year. The nuts should be planted in rough places four feet apart each way and thinned as they grow. Seedlings are variable, and so they must be grafted. The principal varieties are Hale's, a large thin-shelled sort, Leaming, Curtis, Elliott and Mulford. Among the Walnuts, our native Butternuts may, perhaps, be improved, but the so-called English Walnut is the best of the family, although it is difficult to grow as far north as New York. There is no doubt that nut-trees are hard to graft and to bud. Evaporation should be prevented until the sap begins to flow. When the sap starts the grafts should be put in underground. The scions should be cut so as to have the pith all on one side, or, if necessary to graft above the ground, they should be covered well to prevent all evaporation possible.

Recent Publications.

Lessons in Elementary Botany for Secondary Schools.
By Thomas H. MacBride, State University of Iowa. Boston: Allyn & Bacon.

With so many excellent elementary text-books on the science of botany, any newcomer is apt to find a crowded field. But the new year has brought a new botany, which is in a measure a new departure. The plant-lover who has learned his plants in the woods, who has been impressed with the wonderful order and beauty of the trees as they spread their naked branches against a wintry sky, and watched the swelling of the Cottonwood-buds in early spring, seen the Box-Elder twig take on an added color as the warm days approach, and admired the orderly arrangement of the scales in the bursting Lilac-buds, has often wondered that no book-maker has adapted a botany to what he sees about him. The boys and girls begin their study of botany usually just after the Christmas holidays, when all the land is bare, while the text-books have usually begun with the germinating seed, or the tiny seedling. Professor MacBride has been impressed with this incongruity and has endeavored to prepare a book adapted to the season when botanical study usually begins. In doing so he wisely places in the hands of pupils twigs of the trees and shrubs growing all about them—and with which many of them never become acquainted. The author has an important secondary object in view, for in his preface he says: "We have before us the spectacle of a great nation absolutely ignorant of the principles of forestry. If the schools can so shape botanical instruction as to make it practical in the direction of a better appreciation of the value of a tree, they may in so doing advance, not the cause of science only, but of humanity." This sentiment will find emphatic approval in the heart of every tree-lover, and it is a pleasure to add that Professor MacBride's book goes far to fill the purpose noted.

It is a modern book and demands a modern teacher. The days when a student could "pass" in botany without ever having handled a plant, gaining his limited knowledge from the text-book, are over. The book under consid-

eration has little of the didactic in its method. The pupil is forced to study the plant, and the book is merely incidental—a part of the apparatus he uses in reaching his determinations. With the whole realm of outdoor nature as a laboratory, twigs, buds, seeds, seedlings, leaves, buds again, flowers and fruit are inspected in turn, and with the passing season the pupil knows something of his plants and has thought little of his book. This is the true method, and a welcome addition to efficient helps in teaching.

Notes.

In regard to the statement that the Idaho Pear is hardy where other varieties fail, Dr. T. H. Hoskins writes that he does not find it sufficiently hardy for north-western Vermont, or, at least, not more hardy than Flemish Beauty or Ondaga. The trees will live until they begin to bear, but producing fruit and resisting cold winters together prove too severe a strain upon them. The only Pears which have succeeded in northern Vermont are the Russian varieties, which are entirely at home and yield abundant fruit.

A correspondent of *The Independent* writes that the original Apple-tree from which the variety known as Grimes' Golden Pippin has been distributed, is still standing two miles from Wellsburg, West Virginia, at the head of a deep ravine. The tree is about a hundred years old, and Mr. Thomas Grimes, who originally brought the fruit to notice, has but recently died. The tree is untrimmed, neglected and shows many signs of age and decay, and there is nothing about it to indicate that it is the parent of trees scattered all over the world, for even in Australia Grimes' Golden is a famous apple.

A spar of Douglas spruce, which has been one of the conspicuous landmarks at Kew, where it has been used for thirty-five years as a flagstaff, has become decayed at the base, so that it was necessary a short time ago to cut off several feet of it. A new piece has been spliced on and strengthened by iron bands, and the staff is once more erected. The spar was presented to the Royal Gardens in 1861 by Edward Stamp, Esq., and was cut in the woods of British Columbia. Its total height is 159 feet, of which twelve feet are sunk in a brick pit. The age of the tree was about 250 years and its total height about 180 feet.

Mr. J. Hale says that a Peach-tree three or four years old should not be allowed to bear more than 250 peaches, one four or five years old not more than 300, and a full-grown tree not more than 500. This means that the peaches should be at least six inches apart. Five hundred peaches make six to eight baskets of fancy fruit. Three thousand peaches to a tree would sell for less money and ruin the tree. Mr. Hale puts step-ladders under the trees and begins to thin when the peaches are about three-quarters of an inch in diameter, and every fruit that is diseased or stung by the curculio is carried away to be burned. The rest of the thinnings are thrown on the ground and left there.

Oranges are in plentiful supply from the Pacific coast and the Mediterranean, and continue to sell at low figures, although there has been an advance of fifty cents a box during the past fortnight. While Florida oranges are extremely scarce and consequently high-priced, \$1.00 apiece, as stated by us last week, is evidently an error, that being the rate for a dozen. Grape-fruit, the high price of which we noted last week, has since then continued to advance, and the limited importations, now at the close of the season, are commanding extraordinary sums. A few days since two barrels of small-sized grape-fruit realized the extraordinary price of \$20.00 each in this city, and seven barrels were sold in Philadelphia for \$22.00 each.

The floral decorations at Delmonico's on Monday evening for the last of the Patriarchs' balls of this winter, while the most elaborate of the season, were characterized by marked simplicity. In the ball-room the rich cream-colored walls, delicately touched with gold, served as an admirable background. Graceful festoons of wild smilax, from Alabama, depended from the cornice. The unconventional treatment of the large mirrors which comprise the sides of the room was in striking contrast with the profusion of Orchids used in previous years. A hidden trellis of wire half-covering the upper part of each mirror in irregular outline was gracefully covered with the smilax and roses, the effect being that of a wild Rose-bush clambering at will. An effort had been made to use Bougainvillea glabra for color instead of Bridesmaid and Madam Cusin roses,

but persistent search in New York, Philadelphia and Boston secured only enough for one mirror. La Reine tulips, in heavy garlands, afforded the color-relief between the windows, and the chandeliers and music-balcony were gracefully ornamented with roses and asparagus. This color-effect was continued in the corridor, where the walls were heavily banked with pink azaleas, luxuriant plants of Kentia Belmoreana, their immense drooping leaves contrasting with bushy plants of no less graceful Arecas, and with young trees of native New Jersey Red Cedar. Well-grown plants of Nephrolepis davillioides furcans massed with tulips and other pink flowers formed banks for the mirrors in this sheltered promenade.

A bulletin has just been issued by the Division of Botany of the United States Department of Agriculture on Legislation Against Weeds. Laws against noxious weeds are already on the statute books of twenty-five states, and as these are all quoted a comparison between them is interesting. In most of them the common names alone of the weeds to be suppressed are used, and, therefore, in some cases it is doubtful what species is meant. Again, the laws of Wisconsin and Minnesota proscribe species which do not grow in those states, and by a misuse of technical names Wheat and Oats are proscribed in a late Minnesota law. In the Iowa law against Thistles the common name of the Canada Thistle is followed by the botanical name of another plant, and since the law is evidently meant to apply to one species it may be doubtful which of the two is meant. A table of all the proscribed weeds in the different states is given, and Mr. Lyster H. Dewey, who has prepared the bulletin, observes that although the Canada Thistle is proscribed in almost all the states, it is not as generally troublesome as this would indicate. In two of the states Sweet Clover is proscribed, a plant which is rarely harmful as a weed, and in certain places it has been found valuable as a renovator of the soil and as a forage-plant. In the southern states, where the Nut Sedge, the Giant Ragweed and the Wild Onion are most serious pests, there are no laws whatever against weeds, while Arizona is the only state of the Rocky Mountain region and in the Great Basin which has passed such a law, although this region is inhabited by many native weeds which are particularly aggressive, and many introduced weeds thrive with great vigor in irrigated fields. The most interesting part of the bulletin is the chapter on the essential provisions of a general state weed law, which we commend to the legislatures of the various states, most of which are now in session.

On the 5th of February, Mr. Frank H. Nutter read a paper at Taylor's Falls, Minnesota, in which, after discussing in a general way public parks and reservations, with their history and treatment, he gave a preliminary report on the proposed interstate park at the Dalles of the St. Croix, where something like four hundred acres of land, partly in Minnesota and partly in Wisconsin, have been acquired as a public reservation. The Falls proper are not high, but the Dalles, with their lofty and precipitous rocks on either side, stained with brilliant colors from oxides of copper, or painted with Lichens and Moss, make a most interesting passage of natural scenery. Mr. Nutter says it would be difficult to find a more attractive combination than the cheerful sparkle of the upper rapids with its tributary brooks, the gloomy grandeur of the Dalles themselves, the quiet beauty of the lake, the sunny intervals dotted with park-like shade-trees, the lofty hills on the Wisconsin side and the gorges across the river, the picturesque cliffs, the plateau on the western bluffs, with its stretch of virgin forest and a westward prospect over rolling farm-lands. Mr. Nutter has made a hasty survey of the place, and, therefore, does not propose anything like a complete plan, but he feels it necessary to state that any comprehensive improvement on this reservation should be based upon a design prepared after a thorough study of the subject as a whole and in detail, so that whatever is done should be done with an eye to what the park shall be as a unit when it is completed. It is a pity that an elementary statement like this needs to be made to an intelligent American audience, but we very much fear that the people of the east, as well as those of the west, will need to be reminded of such truths over and over again before landscape-gardening assumes its true rank among the arts of design. Of course, Mr. Nutter is right when he says that the future possibilities of such a park, if it is enlarged according to his suggestion, should not be developed by the addition of exotic shrubs and the obtrusion of much artificial adornment, but rather by fostering, protecting and emphasizing its natural features, for a true artist in landscape is the one who strives primarily to develop the poetic charm of the place and preserve its spirit in the line of the sentiment which it naturally inspires.

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The Mountains of California.

THE two great mountain ranges of California, united at the north by a transverse and broken mass of high ridges, but otherwise distinct—the Coast Range rising to elevations of from 2,000 to 8,000 feet and composed of innumerable spurs and rolling hills, enclosing many long valleys opening to the sea, and the Sierras separating the great central valley of California from the deserts which extend from its eastern base to the Rocky Mountains—are the predominant features of the state. The Sierras have a total length of five hundred miles, with a width of some seventy or eighty miles, and several of the highest peaks ascend to over 14,000 feet above the sea-level, Mount Whitney, its culminating point, being the highest mountain in the United States, with the exception of some of the Alaska giants. One of the most beautiful of mountain ranges, it possesses extraordinary interest in the history which is printed on its ice-swept pages, and in the forests of conifers which now clothe its slopes; and in the fascinating book whose title appears at the head of this article Mr. John Muir tells this history and describes the forests, their trees, and several of the animals which live among them, speaking out of a full knowledge and with the feeling and affection of a devoted lover of nature. No one has had such opportunities for studying the Sierras, or knows them so well; and no one, it may be said, has done so much to preserve their beauty by securing the establishment of the Sierra Forest Reservations. Summer after summer, with a blanket twisted over his shoulders and a bag of dried bread crumbs and a pouch of tea at his belt, without a gun or any companion but his own thoughts, he has tramped over the whole range, tracing the lines of extinct glaciers and exploring the highest peaks and the most remote and inaccessible gorges; only descending to replenish his scanty stock of food and passing long winters in a hut in the Yosemite Valley in order to become familiar with his beloved mountains and trees in winter as well as in summer. Interesting as is the story which he tells of the gradual modeling of the Sierras into their present form by the action of ice exerted through countless centuries, it is of the Sierra forest and the Sierra trees, of which Mr. Muir has succeeded in drawing pictures of life-like accuracy and

remarkable beauty, that we must speak to-day. A paragraph like the following, describing the forests of the central Sierras, which seem to live in the picturesque language of which Mr. Muir is master, is a good example of his method:

Here, too, in the middle region of deepest cañons are the grandest forest-trees, the Sequoia, king of conifers, the noble Sugar and Yellow Pines, Douglas Spruce, Libocedrus, and the Silver Firs, each a giant of its kind, assembled together in one and the same forest, surpassing all other coniferous forests in the world, both in the number of its species and in the size and beauty of its trees. The winds flow in melody through their colossal spires, and they are vocal everywhere with the songs of birds and running water. Miles of fragrant Ceanothus and Manzanita bushes bloom beneath them, and Lily gardens and meadows, and damp, ferny glens in endless variety of fragrance and color, compelling the admiration of every observer. Sweeping on over ridge and valley, these noble trees extend a continuous belt from end to end of the range, only slightly interrupted by sheer-walled cañons at intervals of about fifteen or twenty miles. Here the great burly brown bears delight to roam, harmonizing with the brown boles of the trees beneath which they feed. Deer, also, dwell here and find food and shelter in the Ceanothus tangles, with a multitude of smaller people. Above this region of giants the trees grow smaller until the utmost limit of the timber line is reached, on the stormy mountain-slopes at a height of from 10,000 to 12,000 feet above the sea, where the Dwarf Pine is so lowly and hard beset by storms and heavy snow, it is pressed into flat tangles, over the tops of which we may easily walk. Below the main forest-belt the trees likewise diminish in size, frost and burning drought repressing and blasting alike.

In the chapter devoted to the forest all the principal Sierra trees are described, not in the dry and often obscure language of the botanist, but in the words of a literary artist who has studied them in all their varied aspects; and of all the descriptions of trees which we have read these are the only ones which enable the untraveled reader to form, without the aid of a photograph, a really correct and accurate idea of the appearance of the tree in question. Take, as example, Mr. Muir's description of the Juniper of the high Sierras (*Juniper occidentalis*):

The Juniper is preëminently a rock-tree, occupying the baldest domes and pavements, where there is scarcely a handful of soil, at a height of from 7,000 to 9,500 feet. In such situations the trunk is frequently over eight feet in diameter, and not much more in height. The top is almost always dead in old trees, and great stubborn limbs push out horizontally that are mostly broken and bare at the ends, but densely covered and embedded here and there with mossy mounds of gray foliage. Some are mere weathered stumps, as broad as long, decorated with a few leafy sprays, reminding one of the crumbling towers of some ancient castle scantily draped with ivy.

Here, in a few words, is a description which presents the living tree to our eyes as clearly as if it was standing before us as we read, and it is this clearness and simplicity in description which seems to us to be the great charm and merit of the book.

Of especial interest are Mr. Muir's studies upon the history, distribution and age of the Sequoia gigantea, one of the most interesting as it is the largest of American trees. The Sequoia grows in a widely interrupted belt from the middle fork of the American River to the head of Deer Creek, a distance of about 250 miles, the elevation of the belt above the sea varying from 5,000 to 8,000 feet. At the north the Sequoia occurs only in small isolated groups, which are sometimes from forty to sixty miles apart, but south of King's River it is not restricted in groves, but extends across the broad basins of the Kaweah and Tule rivers in noble forests for a distance of nearly seventy miles. South of the cañon of the south fork of King's River there is a forest of Sequoias about six miles long and two miles wide. This is the most northern assemblage of this tree that can be called a forest, the very finest being found, however, on the north fork of Tule River. It has long been known that in the northern groves there are comparatively few young trees or saplings, and this fact led to the belief, before the discovery of the southern forests, that the Sequoia was gradually dying out. But in

the southern forests Mr. Muir finds "that for every old storm-stricken giant there are many in all the glory of prime vigor, and for each of these a crowd of eager, hopeful, young trees and saplings growing heartily on moraines, rocky ledges, along watercourses and in the moist alluvium of meadows, seemingly in hot pursuit of eternal life."

The largest Sequoia Mr. Muir has measured is in the King's River forest, and is thirty-five feet eight inches in diameter inside the bark four feet from the ground. Such a tree he believes to be more than five thousand years old. His observations upon the age of the Big Trees are interesting and important. The stump of a tree in the Calaveras grove, when examined many years ago by Professor Asa Gray, showed about 1,300 layers of annual growth, and led him to believe that the reputed age of these trees had been greatly exaggerated. A tree cut in the King's River forest, however, of about the same size as the Calaveras tree, and not very old-looking, Muir found to be 2,200 years of age, while the King's River giant displayed over 4,000 rings in an incomplete section which he was able to examine. "No other tree in the world," he says, "so far as I know, has looked down on so many centuries as this Sequoia or opens such impressive and suggestive views into history." It has generally been believed, too, by naturalists that the Sequoia was once far more widely distributed over the Sierras than it is at present. Mr. Muir, however, has reached the conclusion that it has never been at any time since the glacial period more abundant than it is now, his careful examination failing to reveal a single trace of its previous existence beyond its present bounds. Sequoias, apparently, do not die a natural death, and, barring accidents, appear to be immortal, living on indefinitely unless destroyed by man or fire, smashed by lightning or thrown down by storms or by the sliding down of the ground on which they stand. When one of the Big Trees falls, the trunk, which is practically indestructible by the action of the weather, may remain on the ground for centuries, and when it is finally destroyed by repeated burnings, a great trench, caused by the weight of the falling tree, permanently marks the place where it has laid. Such trenches exist in all the Sequoia groves and forests, but beyond their limits Mr. Muir has searched for them in vain—conclusive evidence, it would seem, that the Sequoia belt has not undergone any great diminution since the close of the glacial epoch.

The Sequoia was probably one of the first trees that obtained a foothold on the Sierras after the ice-sheet began to break up into individual glaciers, and its distribution in isolated groves and forests may be accounted for, as Mr. Muir suggests, by the fact that when it first appeared on the exposed ridges the intervening space was occupied by glaciers. The Sequoia belt, therefore, attained its greatest development at the place where, owing to topographical peculiarities, the ground had been most perfectly protected from the main ice rivers that pour down from the summits long after the smaller local glaciers had melted. Contrary to the now generally accepted theory that the Sequoia which existed in the Arctic Circle during the tertiary epoch reached California from the north, Mr. Muir believes "that as the Sequoia forests present a more and more ancient aspect as they extend southward, the species was distributed from the south, while the Sugar Pine, its great rival in the northern groves, seems to have come around the head of the Sacramento Valley and down the Sierra from the north.

We wish space would permit us to speak of the chapter devoted to the Douglas squirrel, the great Sierra forester, as Mr. Muir calls him, the devourer and incidentally the disseminator of coniferous seeds, and of the other animals and birds whose habits he describes with such delightful freshness; but for these we must refer our readers to the book itself. During the last fifty years a number of books in which nature and natural objects have been discussed in what may, perhaps, be called the poetical method, have appeared. None of them, however, in our judgment, com-

pare with Mr. Muir's production in truthfulness of observation and beauty of expression, and The Century Company has done a useful thing in collecting in a volume these essays on the Mountains of California, which first appeared in slightly different form in the pages of *The Century Magazine*.

The Strawberry in New England.

IT is well known that this fruit has been cultivated for centuries in the Old World, but some misconception seems to exist in regard to the date of the cultivation of the Strawberry in New England, as well as to its abundance in early times. In the last report of the Connecticut State Board of Agriculture, page 66, a member stated that he could not find that the Strawberry was cultivated here in gardens previous to 1824. Dr. Timothy Dwight, in his delightful volumes of *Travels in New England*, published in 1821, though written earlier than 1817, gives a list of five different varieties of Strawberries, four of which he had under cultivation in his garden. He mentions the following varieties: The Red Meadow, White Meadow, Field, Hudson and Hautboy. Dr. Dwight says: "The Meadow Strawberry of this country is the best fruit of the kind which I have seen. It is rather larger than the Chili Sweet, and more prolific. It also improves greatly by culture. I have seen several which were four and a half inches in circumference, many which were four, and bushels which were between three and four." And he further states: "I have cultivated the Wild Meadow Strawberry more than twenty years, and during that time it has increased to twice its original size."

In regard to the Field Strawberry, he says that it "is sweeter, ten days earlier, but much smaller, than the Meadow Strawberry, and has not increased in size by a cultivation of eight years in my garden. The plants become immediately much larger, but the fruit has not been changed at all." He also mentions the Hautboy and Hudson varieties as having been in cultivation for many years in his garden. The former variety is a well-known European form; the latter is a form I am not familiar with, although I suspect it to be an old cultivated variety common in these days. These statements of Dr. Dwight, who died in 1817, show that the Strawberry was in cultivation in New England before the beginning of this century.

He, moreover, states that the Hautboy Strawberry, *Fragaria elatior*, has been found growing spontaneously in two distinct and remote localities in Connecticut. This statement, if true, would undoubtedly indicate that they were introduced through the agency of birds.

The White Meadow Strawberry which he calls attention to is a mere sport or variety of the ordinary Red Strawberry. It is also mentioned by Dr. Dewey in his *Plants of Massachusetts*, 1890, page 59, as occurring plentifully in the Berkshire Hills.

In regard to the abundance of the Strawberry in early times there appears to be some misconception also. Every one is aware that there are few places in Massachusetts where it would be possible now for one to gather more than a few pints of strawberries in a whole day. In early times, however, when there was more virgin soil than there is to-day in New England the wild Strawberry was very abundant, and frequently grew to a much larger size than at present; and even within the recollection of men now living this fruit was by no means rare in this state, neither is it in Nova Scotia and New Brunswick to-day. William Wood, an early visitor and accurate observer, states in his *New England Prospect*, published in 1635, that "there is likewise growing all manner of Hearbes for meate and medicin, and that not onely in planted Gardens, but in the woods, without either the art or helpe of man. . . . There is likewise Strawberies in abundance, verie large ones, some being two inches about. One may gather halfe a bushell in a forenoone." And in 1643 Roger Williams wrote: "This berry (Strawberry) is the wonder of all the fruits growing naturally in those parts; it is of itself excellent, so that one of the cheiftest doctors of England was wont to say that God could have made, but never did, a better berry. . . . In some parts, where the natives have planted, I have many times seen as many as would fill a good ship within a few miles' compass. The Indians bruise them in a mottar and mixe them with meale and make Strawberry bread." Strawberry bread appears to have been in common use among the Indians, as we find it mentioned by other writers, notably Gorkin, who was a co-worker with Rev. John Eliot among the Nipmucks and other Massachusetts tribes. These statements, with many others which could be cited, show conclusively that the wild Strawberry was once very abundant here in New

England, and undoubtedly the principal reason for the decline of this wild fruit is the exhaustive conditions of our soil. In early times the clearing of an old wood gave rise to abundance of these berries, and they were noted as being abundant in our meadows. The Strawberry, however, is not the only natural crop that has changed. Many of our meadows, which now produce a crop of grass hardly worth cutting, once supported a luxuriant growth of the Fowl Meadow Grass, "thick and long, as high as a man's middle, some as high as the shoulders, so that a good mower might cut three load a day." To-day, however, hardly less should be expected, since for generations crops have been removed from the soil without the return of any plant-food, whereas in olden time, before the advent of the white man, everything was allowed to decay where it fell, which meant a considerable yearly increase of organic matter to the soil.

Agricultural College, Amherst, Mass.

G. E. Stone.

Foreign Correspondence.

Orchids at Kew.

A HAND-LIST of Orchids cultivated in the Royal Gardens, Kew, has just been issued and may be obtained from the Curator, price sixpence. This is the fourth of the series of catalogues of the Kew collections of living plants printed within the last two years, the other three being part I. of the hardy trees and shrubs, Ferns and Fern allies, and hardy herbaceous and alpine plants. The intention of the Director is to catalogue the whole of the collections of living plants at Kew, the total number of species being estimated roughly at twenty thousand. A list of the conifers is already in the printer's hands, and this will be followed by the second part of the hardy trees and shrubs.

These lists are of horticultural value because, while they comprise a large number of species of more or less interest to botanists, they also include practically all the plants cultivated in gardens for ornamental or economic purposes. No pains have been spared to make the nomenclature accurate and in accordance with the views of recognized authorities. Many garden names are reduced as synonyms or errors, but through lack of sufficient material or information some which are provisional have been retained. The author of the name, habitat of the plant and, where possible, a reference to a published figure are given with each species. The value of these lists must be evident to any practical horticulturist who has to deal with large collections and to whom the almost hopeless confusion of names by dealers and others must have often presented difficulty. By dealing thus thoroughly and comprehensively with the whole of cultivated plants, Kew has rendered great service to horticulture, whose followers, it is to be hoped, will adopt the names preferred by the Kew authorities and thus bring about uniformity where, till now, there have been confusion and doubt.

The Orchid list enumerates 200 genera and 1,800 species (including about fifty garden hybrids) as being represented by living examples at Kew. The greater proportion of these are what are popularly known as botanical curiosities, which would not find favor with those who are interested in beautiful flowers, but which, nevertheless, are worth a place at Kew, where the main object is botanical, and to represent the order in as comprehensive a way as possible. As an example I may cite the genus *Pleurothallis*, of which there are forty species at Kew, but not more than half a dozen of them would be looked at a second time by the ordinary collector. The genus *Bulbophyllum* is represented by sixty-four species, *Cirrhopetalum* by thirty-one, *Angracum* by thirty-nine, *Dendrobium* by one hundred and forty, *Masdevallia* by eighty, *Oncidium* by one hundred and eight species, and so on.

This collection has been slowly built up in various ways, partly by purchase or exchange, partly through the kindness and interest of travelers and residents in countries where Orchids abound, and by the generosity of some of the collectors and cultivators of Orchids in this country. Many of the plants are small, perhaps obtained from a scrap taken from a specimen sent to the herbarium for

identification, all such that come into the Kew net being good fish.

The introduction to the hand-list contains some interesting information about the Kew collection in particular, as well as about Orchids in general. The accommodation for Orchids at Kew is not first-rate, only two houses to which the public are admitted being available for their display, and these are so ill-adapted for the cultivation of Orchids that they are practically only show-houses in which the plants are placed when in flower. The bulk of the collection is grown in some half-a-dozen small houses to which the public cannot conveniently be admitted. It would, however, be possible to provide houses which would be suitable for the culture of Orchids, and to which the public might have free access.

Orchids have been continuously cultivated at Kew from their earliest introduction into this country. The varied fortunes which have attended the collection practically reflect the history of the progress which has been made in the art of growing Orchids under artificial conditions.

The first exotic Orchid which was introduced into English gardens was *Bletia verecunda*, which was obtained from Providence Island, Bahamas, by Peter Collinson, in 1731, and flowered in the following year in the garden of Mr. Wager. About the year 1778 *Phajus grandifolius* was imported from China by Dr. Fothergill, and a full-sized colored figure of it is given in the first edition of the *Hortus Kewensis* under the name of *Limodorum Tankervilleæ*. A peculiar interest attaches to this plant because it was in it and at Kew that in 1802 Francis Bauer, who was "resident draughtsman for fifty years to the Royal Botanic Garden," discovered and figured the "nucleus of the case," an all-important body, the first description of which was published by Robert Brown in 1833.

In the first edition of Aiton's *Hortus Kewensis* fifteen non-British species are enumerated as cultivated at Kew. Sir J. E. Smith wrote: "We have scarcely seen any one species of this genus (*Epidendrum*), except in a dry state, before the year 1787, when *E. cochleatum* flowered at Kew, nor was it till October, 1782, that *E. fragrans*, of Swartz, exhibited its rich and elegant bloom in the same rich collection. At present several species are to be seen flowering in the spring and autumn."

In the second edition of the *Hortus Kewensis* (1813) 115 species are enumerated, of which eighty-four are exotics belonging to thirty-nine genera. In 1848 the number of species cultivated at Kew had increased to 755, and in 1872 the number of species and varieties was 851, belonging to 138 genera. Since then the collection has grown steadily. The collection of Orchids in the botanic gardens at Glasnevin, Dublin, is almost, if not quite, as rich in species as that at Kew.

The essential cultural requirements of Orchids were not known till long after they had attracted the attention of horticulturists. It is interesting to note the struggles of our great-grandfathers to discover the conditions most suitable for them. We who know all about it are surprised that any intelligent cultivator should have tried to grow epiphytic plants "in common soil in pots plunged to the rim in a tan bed." Teak baskets, sphagnum moss, peat fibre and charcoal appear to us to be exactly what any intelligent schoolboy would have recommended as supplying the right material for an epiphyte. But, like all useful discoveries and inventions, simple as they appear to us, they were not worked out without much thought, experiment and the sacrifice of many plants. One of the shrewdest of botanists working in the van of the horticultural art of his time, Dr. Lindley, stated in a paper read to the Royal Horticultural Society in 1830 that "high temperature, deep shade and excessive humidity are the conditions essential to the well-being of Orchids." Thirteen years later another Orchid authority, Mr. Bateman, recommended the same treatment, adding that a resting season was necessary. This treatment became the only orthodox one, and was persisted in for upward of thirty years.

Two men, however, broke away from the current tradition, and with conspicuous success. One of the first of these was Joseph Cooper, gardener to Earl Fitzwilliam, at Wentworth (1835). A still bolder innovation was adopted shortly afterward by Paxton, at Chatsworth. In both cases the essential innovations were lower temperature and increased ventilation. The old tradition still, however, held its ground; plants perished under the barbarous treatment they received in the hot-houses of this country almost as fast as they were imported. To such an extent were the losses felt that Lindley, in a remarkable article published in *The Gardeners' Chronicle* toward the end of 1859, pronounced their treatment "a deplorable failure," and which Mr. Bateman also some years later characterized as "incredible folly."

Even within the last twenty years considerable advance has been made in the art of Orchid culture. We now recognize that fresh air at all times is essential, that many Orchids enjoy bright sunshine, that while some require plenty of moisture all the year round, others require it only for a portion of the year, and that some even thrive only when treated as if they were Cacti. The temperature for exotic Orchids varies from a purely tropical to that of a few degrees above freezing point, and while some species during growth are kept in a hot steamy atmosphere, and after growth is completed are removed to comparatively cool and dry conditions to afford them a rest, others suffer if the conditions are not fairly uniform all the year round.

London.

W. Watson.

New or Little-known Plants.

Viburnum erosum.

THIS is one of a small group of North American and Asiatic *Viburnums* whose leaves are furnished with small linear stipules. It is a stout shrub five or six feet in height, with slender much-forked branches covered with orange or reddish brown bark. The leaves are oblong-ovate or oblong-obovate, acuminate, gradually narrowed, wedge-shaped and often unequal at the base, erose-serrate, with slender spreading rigid teeth, stellate-pubescent, membranaceous, dark yellow-green on the upper surface and pale and rather lustrous on the lower, and rusty-pubescent on the under side of the thin midribs and in the axils of the remote primary veins; they are from two to three inches in length and from an inch to an inch and a half wide, with stout pubescent petioles about a quarter of an inch in length. The flowers appear in May in lax pubescent long-stalked corymbs about three inches across, with linear-lanceolate scarious reddish bracts and bractlets. The corolla is rotate and greenish white, with rounded lobes about half as long as the stamens. The fruit is red, with a flat stone, slightly thickened and obscurely two-ridged on the back, and furnished with a short mucro at the apex.

In Japan *Viburnum erosum* inhabits the southern island of Kiushiu and southern and central Hondo, where it is not rare at elevations of three or four thousand feet above the sea in the mountain districts crossed by the Nakasendô; it also inhabits Formosa, southern and central China and Corea.

*Viburnum erosum** has been cultivated in the Arnold Arboretum since 1880, having been received in that year from the Parsons' Nursery in Flushing, Long Island; and the flowering branch in the illustration on page 85 of this issue is from a specimen grown in the Arboretum; the fruit represented on the plate is from a wild Japanese specimen. Of considerable interest botanically, *Viburnum erosum* is less desirable as an ornamental plant than several of the North American and Japanese species now to be found in gardens.

C. S. S.

* *Viburnum erosum*, Thunberg, *Fl. Jap.*, 124 (1784).—De Candolle, *Prodr.*, iv., 327.—Maximowicz, *Mém. Bot.*, x., 666.—Franchet & Savatier, *Enum. Pl. Jap.*, i., 200.
—Hemsl., *Jour. Linn. Soc.*, xxiii., 351.
Viburnum erosum, var. *Formosanum*, Hance, *Ann. Sci. Nat. sér. 5*, v., 216 (1866).
Viburnum dilatatum, B. *Formosanum*, Maximowicz, *l. c.*, 666 (1880).

Cultural Department.

Vegetable Notes.

ALTHOUGH the cultivation of Cucumbers during the winter months is somewhat troublesome, they are comparatively easy of management during the longer and brighter spring days. Plants from seeds sown at the end of February will give a supply of fruit from about the middle of April until plants outside begin to bear. The starting of seeds is sometimes troublesome on account of damping off just after germination has begun; this can be prevented by careful planting. A little study of the habit of the seed will show that the embryo breaks through the shell at the point or thin end, the root being first produced. The seeds should be set so that the root can go directly down into the soil and the top shoot upward. If the seeds are sown at random the little plant, after germination, is sometimes in a position from which it cannot extricate itself. They should be sown in small pots in a light sandy soil and placed in a good bottom-heat; as soon as the plants are up they should be removed to a light situation near the glass, but shaded from strong sunlight. They must be shifted into larger pots as soon as they are strong enough, using a heavier soil than before, and which the roots will now be able to take hold of. When planted into their permanent quarters a few tobacco-stems spread about will help to keep off the black fly, which is always a ready enemy. It is necessary to keep the atmosphere moist and to syringe twice daily on bright days, but the syringing must be done lightly, as the leaves are tender and easily damaged. On this account smoking should never be resorted to as a means of destroying the fly, but if this pest becomes troublesome fresh tobacco should be spread over the pipes and sprinkled with water. This should be done when the pipes are warm and the house is closed. A night temperature of sixty degrees is sufficiently high, with a rise of fifteen degrees through the day. The plants may be slightly shaded to advantage when the sun is bright. We have tried several varieties, but find none equal to Telegraph for quality, productiveness and free growth.

A sowing of Cauliflower seed for frame work should be made toward the end of February, and the last batch should be planted indoors. It is not advisable to plant indoors any later, as the bright sunlight proves too much for them after the beginning of April. No matter how carefully they are watered and aired after that date the plants will flag on bright days. This flagging has the effect of injuring the quality and reducing the size of the head, and also induces a number of heads to come hard and open and unfit for table use. While in frames the plants are not subjected to the same drying influences and can have more air by removing the sashes during favorable weather. If the soil in the frames has already been used for a similar purpose, about a foot of it should be removed and replaced with well-enriched fresh soil. For this, as for greenhouse work, the dwarf varieties, such as Snowball and Dwarf Erfurt, should be chosen, since they give the best returns in the least space.

Sowings of Boston Market and Tennis Ball Lettuce should be made in flats for planting in frames later on, and of Golden Queen for indoor work. We find this latter variety resists heat better than any we have yet tried and can, therefore, recommend it to keep up the supply. During the winter months it can be grown at a night temperature of fifty degrees, while such varieties as Rawson's Hot-house and Boston Market do better ten degrees lower. The latter varieties would probably take from ten to twelve weeks to mature, while Golden Queen, at a night temperature of fifty degrees, can be had fit for use in eight weeks from the time of sowing. It also does well at a lower temperature, though the growth is correspondingly slower, and it is questionable if it pays to maintain a high temperature for Lettuce during winter, except in cases of emergency.

Early Warwick and Red Valentine Bush Beans still prove the most suitable varieties. Successive sowings may be made in benches or in pots. They are convenient in pots during the spring months, as they can be shifted about to economize space in the benches. The Beans are sometimes hard to start for lack of bottom-heat, but the pots can be set directly over the pipes, and if kept well supplied with water the seed comes up quickly. Ten-inch pots are a convenient size. They should be only two-thirds filled with soil when the seed is sown, the other third being added after the plants are large enough to permit of it. Five or six plants are enough to a pot of this size, but it is better to sow plenty of seed and thin out after the strongest plants can be selected. If subjected to a dry atmosphere red spider is apt to be troublesome, but syringing may be freely practiced, and this will help to keep the plants clean. A light situation and full exposure to sunlight suits them best.

Tarrytown, N. Y.

William Scott.

Seasonable Notes on Chrysanthemums.

WITH the distribution of new Chrysanthemums we may say the season of these flowers for 1896 has commenced. With the watchful cultivator it has never ended. When the last flowers are cut we gather our stock for the coming season, study notes, and secure what we can of the new varieties which have impressed us favorably when visiting our neighbors and at the exhibitions. As often happens, the stock of some varieties, much sought after, is limited, and so we are propagating and growing all winter long. The bulk of our stock plants are yet in cold frames. They have not been frozen during this uncommonly mild winter, so that cuttings have been taken as needed. It is only during recent years that we have come to pay due attention to our stock during what

the season before for specimen blooms. I have tried this plan, but with indifferent success. Young plants taken as cuttings, when old plants were started, outgrew them in four months, which is only about half a season's growth. I am told that one gardener, following the English practice, grew some plants all last season for the sole purpose of making specimens of them this. It is to be hoped that these plants will be exhibited, so that we can have an opportunity of judging between the English and American methods.

Experience shows that cuttings root better during the month of March than at any other time. Later, as the sun gains power, the air grows drier and closer attention must be given to the work of propagation. Indeed, I am acquainted with good gardeners who have been unable to understand why they lost a large percentage of cuttings during the late spring



Fig. 9.—*Viburnum cerosum*.—See page 84.

may be termed the resting season. It has been too much the custom to shove the plants under benches and pay little or no attention to them until they were needed. We were certain in this way of some sort of cuttings, but experience has proved that it is advantageous to have our stock hardy, healthy and exposed to air and sunshine on every available opportunity. Some growers now even take the trouble to grow plants in the open garden exclusively for stock.

As stated in previous notes, our plants intended for specimens were started a month earlier than usual, and we have lately moved them into six-inch pots. Ordinarily we should now have them in four-inch pots. In this stage they would be early enough for all practical purposes and would make quite large specimens. Some English growers start plants in December and grow on old plants which have been cultivated

months. During the months of May and June a close, well-shaded propagating frame is essential, and complete saturation for the first four or five days. It is hard to remedy the results of exposure even for a few hours, except in moist weather, or evening and early morning. The value of new varieties has almost invariably been estimated with a view to specimen blooms, and judges have never required that exhibitors of such varieties should show growing plants. It has, therefore, been with difficulty that those interested in specimen plants have been able to select such as are useful for their purpose among novelties. But, so strong is the desire to be abreast of the times, that in nine out of ten places one visits he will find growers relying on untested novelties and discarding many available varieties which have been tried and found suitable. I have done this myself. Due credit, however, is always given

to novelties shown in first-class condition, so that, while not relying upon them, we always grow to the best advantage such as are most promising. Our list of varieties suitable for specimen plants has been made with care, and, although extending over a number of years, is by no means large. Practical experience must alone guide, and when looking over the lists I often see kinds noted as suitable for specimen plants which have not proved so with me. To give an idea how few plants are really suitable for this purpose I will say that *Crystalina*, a dwarf early white, and *Mrs. S. T. Murdock*, pink, were the only real good ones found among all the introductions of 1895. The most promising varieties for 1896, so far as I have seen, are *Mrs. Perrin*, pink; *Gretchen Buettner*, white; *Violescent*, bluish, and *Columbine*, bright bronze; the latter being especially recommended.

It has been said that the popularity of the *Chrysanthemum* is on the wane. No doubt, the Japanese varieties have been overdone, but that the *Chrysanthemum* will ever become unpopular I do not believe. There will rather be a return to a larger variety of types, and many of the old kinds will come into favor. Already we see this. We shall see more pompon-flowered varieties grown as pot-plants. They are handsome in all sizes and shapes, and, being naturally bushy in habit, are less formal than trained specimens; they are nice, too, for cutting in sprays. Anemone-flowered varieties have a beauty all their own. They do not mix well with the large Japanese or formal Chinese sorts, but they supplement them, and small plants are very effective in grouping, far more so than the large-flowered varieties.

Varieties fresh from the introducers usually come with the balls of earth pressed closely about the plants. I find it a good plan to carefully loosen the soil by gentle pressure before placing them in new soil. Of late years, mainly for want of space, I have put mine in flats, with plenty of room for branching, placing them on shelves near the glass. Here they make good stocky plants. I take the tips off as soon as the plants become hardened, and root them. These often make better plants than the original stock. Such varieties as I wish to grow solely for specimen blooms I cut in hard. This encourages shoots of the sucker type, and these make the very best cuttings. Leaf-eyes of any exceptionally rare variety, such as *Philadelphia* was last season, or *Mrs. Perrin* will be this, may be rooted quite as easily, and some of the finest blooms have been raised in this way.

Wellesley, Mass.

T. D. Hatfield.

Pentstemons.

THE old-fashioned border flowers are no longer so carefully tended as they once were by the specialists, and it is a rare thing now to find a good collection of Tulips, Auriculas, Carnations or Picotees. In the old days the number of plants in cultivation was small in comparison to what it is to-day; the limits of horticulture were circumscribed for those of moderate means, and the result was that these classes of plants were taken in hand by enthusiasts who became identified with one or more of each and made a close study of them, with the result that they were improved to the utmost limit, and there are no better kinds to-day than there were a generation ago. The old-time exhibitions have largely died out, too; many, if not most, of the plants formerly displayed it would be impossible to obtain now. This must not be considered a retrogression altogether, but rather an indication that gardening is too broad a subject to be restricted to exhibition limits, and border Carnations, Tulips, Auriculas and Pentstemons are grown now to be enjoyed in the garden instead of on the show board with the regulation frilled white paper collars round each bloom.

It is more especially of the *Pentstemon* that I wish to speak as I saw it at its best in English gardens last August. At Kew especially, in the public parks and everywhere in home gardens, large beds were devoted to them, and the colors were as brilliant as those of *Gladioli*, and with about the same range of colors, too, but with more elegantly shaped flowers. The flowers were as large and the spikes as tall as well-grown *Foxgloves*, and admirably adapted for house decoration when cut. The season of bloom, too, lasted for two months I was told, and it seemed there were few plants that could give such returns for so little trouble. When asking about the sorts I was told that they were in all cases seedlings raised from a sowing made early in the year and set out in summer, the plants being treated as annuals instead of perennials; in this way winter storing was dispensed with. Seed was saved from the best flowers each year for the display to follow. Now, it at once occurred to me that the progenitors of this race of garden *Pentstemons* are all north-western American plants, the domi-

nating blood being that of *Pentstemon Hartwegii*, its brilliant scarlet being very evident, while the more sombre purples and blues were derived from *P. Coboca* and others. As now grown, however, they are distinct enough in themselves to lose any identity with any particular species.

There seems to be no reason why we cannot have beds of these fine border flowers as easily as they are obtained in Europe. There may be cultivators of *Pentstemons* here, but I have not seen them. Here we have made a start in the right direction by securing seeds from several sources and the plants are well up now; the results will be noted later in the summer, but there seems to be no reason to doubt that the experiment will be a success.

South Lancaster, Mass.

E. O. Orpet.

Warming Tanks for the *Victoria regia*.

DURING the past season the *Victoria regia* was grown most successfully in some of our public parks and gardens for the first time, and excited much interest in aquatic gardening. Where the *Victoria* can be grown well it is always a surprise to those who are not familiar with it, and every one is impressed with its queenly rank among *Water-lilies*. To secure a perfect specimen it is necessary to have an artificially heated tank, for our season is otherwise far too short. The plant cannot be safely set out until settled warm weather, or about the end of June or beginning of July. With continuous summer weather the plant attains only fair proportions when cool nights and shortening days are upon us, but with artificial heat a tropical temperature can be maintained for six or eight weeks before warm weather sets in, and the plants will have reached good proportions and be a source of enjoyment throughout the summer months. Few plants are grown entirely under glass during the whole season, although there are advantages in such treatment. It is much more enjoyable, however, to inspect these marvels of the tropics in the open air rather than under a glass roof in summer's heat.

Plants for the open-air pond or tank should have attention now. The seeds may be sown any time before the second week of March in water kept at a temperature of eighty-five to ninety degrees, Fahrenheit. They will germinate in about twenty days. The plants make rapid growth and will require repotting at intervals before becoming pot-bound or exhausted in small pots. If this detail is attended to the plants will make satisfactory growth and be of the first size for planting out when the season arrives. The plants should be kept steadily growing from the seed-leaf to the mature plant. The matter of heating tanks for *Victoria regia* and for other tropical aquatics has received attention from many cultivators since the *Victoria* was first introduced. Several systems, more or less satisfactory, have been adopted, but I feel sure that the best and most satisfactory has yet to be adopted. If a system of hot-water heating is already in use in the establishment, it is advantageous and economical to adopt this for heating the tank. But a long stretch of piping in one tank is not practicable, as the heat is soon given off and a great portion of it is therefore useless. I have used hot water under pressure for heating tanks in connection with the greenhouse plant, and found in shallow tanks, eight inches deep, that one one-inch pipe through the centre of the tank is as effective as a one-inch flow and return pipe through the same. The return pipe is cold almost always, except during hard firing in severe weather in winter. Steam-heating in the ordinary way is to be condemned. It is unreliable, unsteady and dangerous, and needs constant and careful watching. At the point of contact, where the steam-pipe enters the tank, the water will be very hot, the steam condensing as soon as it enters the submerged pipe, and little heat is conveyed a few feet farther along. Consequently a tank twenty feet long would be very hot at one end and many degrees colder at the other. Having recently had a house one hundred feet long fitted up for aquatics and heated by steam, I endeavored to have a large tank heated by the same system, and to overcome the difficulties mentioned I selected a two-inch pipe to run through the centre of the tank on the floor. Through this pipe the steam-pipe (one inch) was conveyed, making the ends of ingress and egress perfectly water-tight, and thus forming an air space between the steam-pipe and the radiating surface of the two-inch pipe. By such an arrangement the steam-pipe at no time comes in direct contact with the water, and the air space is uniformly heated through the entire length. The water in the tank is also uniformly heated and an even temperature is maintained. This plan obviates the objections to the ordinary steam-pipe submerged, and it is the best method I have found for warming the water in *Lily*-tanks by steam-heat.

Riverton, N. J.

William Tricker.

Correspondence.

Daffodils in California.

To the Editor of GARDEN AND FOREST:

Sir,—It is probable that more Daffodils are in bloom now (February 1st) on the farm of James Shinn, near Niles, Alameda County, than can be found in all the rest of the state put together. The original stock was imported about thirty years ago by the late E. P. Sanford, of Oakland, a prominent druggist, whose garden was for many years one of the notable features of that town. When the growth of Oakland made the sacrifice of the garden necessary, part of the stock of Daffodils, then greatly increased, was taken to Niles, and received a judicious amount of neglect for many years.

At the present time the Daffodils have taken possession of a large part of the available garden area. They are allowed to grow in clumps for five or six years without separation, and then it becomes necessary to extend the plantation further and further into the surrounding orchard. The surplus flowers are sent to San Francisco for sale, and the following items from the beginning of the present season will serve to show how well suited the climate is for this flower:

Three dozen flowers were shipped as early as January 17th; by the 24th the daily cutting was thirty-five dozen, and by the 31st it had reached 300 dozen, with the supply still increasing and destined to continue for several weeks.

We have been trying to identify the leading variety represented here. Ninety-nine out of a hundred flowers are a large, firm, rich-colored, single Trumpet Daffodil, much resembling the Ard Righ, though earlier; at least, earlier than imported Ard Righ bulbs when planted alongside of them. We have planted a good many named varieties which may develop better qualities in course of time, under the favoring conditions, but at present nothing among the yellow Trumpet varieties is equal to our own stock in earliness or excels it in general effectiveness.

As a rule, Trumpet Daffodils bloom here under open-air culture by the middle of January. The Paper-white Narcissi are in bloom by December 1st, and often a fortnight earlier. They are still blooming (February 1st), while the Trumpets are approaching their prime. A few double Trumpets are now in bloom, but the majority will not appear for a fortnight or more, and, in fact, the double forms of the *Medii-coronatae* group are not at all prominent until the single Trumpets have gone. Various types of the *Polyanthus Narcissus* are naturalized in large clumps in the shrubbery, as are many others of the true Daffodil sections, but none of the clustered Narcissi seem quite as much at home as do the single Trumpet Daffodils.

Niles, Calif.

Charles H. Shinn.

Bulb-farming for the South-west.

To the Editor of GARDEN AND FOREST:

Sir,—Recent experiments indicate that certain favored sections of this country are as well adapted as Holland to the production of an extra quality of bulbs, and this is a matter worth investigating since America imports these bulbs by the million every year. Here and there through the south favorable reports have been made. In particular, Professor Massey, through the columns of GARDEN AND FOREST, has called attention time and again to the possibilities of North Carolina in this direction. The South Ozark region, in my opinion, is another promising field for bulb-growing on a large scale. This region, according to a recent isothermal map, consists of about three tiers of counties, five or six of which are in south-western Missouri, and ten or twelve in north-western Arkansas, together with a strip of Indian Territory adjoining them. From the greater height of the mountains and the different slope of the ranges this belt of land has a warmer climate than the country to the north, south and west of it, and the conditions of local rainfall are much modified also. The distinctions of soil are even more marked. Although rough and broken, it has a peculiar quality that produces remarkably fine fruit. This is the country which sent out the big red apples to win the world's prize and make Arkansas famous at the Columbian Exposition.

This same quality of soil produces as noticeable a development of bulbous plants. Except Hyacinths and Crocuses, which, while they do not really run out, do only fairly well, other spring bulbs multiply so rapidly and grow so large as to suggest competition with Holland. Tulips, particularly the later sorts, increase wonderfully, and the bulbs are large and plump. But, above all, this is a paradise for *Narcissus*. Six undersized bulbs of one of the varieties of the *Incomparabilis*

section were planted nine years ago, and lifted last fall, when their increase nearly filled a half-bushel. More than that, many of the bulbs were larger and heavier than any imported ones I ever saw. Impressed by the fine appearance of Ozark-grown bulbs, I have for several years tried various members of the *Narcissus* family for forcing, and can say positively that they are all excellent for this purpose. I have tried the *Polyanthus* varieties only slightly, but they promise well also, and seem to show no sign of tenderness.

Summer bulbs also do exceedingly well in this same region. *Gladioli* and *Tigridias* produce bulbs, or corms, of prodigious size, and whereas eastern growers complain that their largest bulbs of *Gladiolus* do not give as fine flowers as those of smaller size, the larger our bulbs grow the longer are the flower-spikes and the larger the individual flowers. It would seem that a *Gladiolus* or *Narcissus* farm might prove a paying venture here.

Pineville, Mo.

Lora S. La Mance.

The Forest.

Forest Protection.—I.

The fourth volume of Dr. Schlich's *Manual of Forestry* deals with the very wide subject of Forest Protection. It is a translation and an adaptation of *Der Forstschultz*, by Dr. Richard Hess, Professor of Forestry in the University of Giessen, by Mr. W. R. Fisher, of the English Forest School at Cooper's Hill. Mr. Fisher has improved upon Dr. Hess, not only by a very important addition from his Indian knowledge of forest subjects, notably with respect to forest fires, but also by drawing from the resources of French literature on the subjects of torrents and dunes, and by adding the results of the more modern research on the constitution of woody plants from the works of Robert Hartig. The result is a thoroughly practical book, peculiarly distinguished by the range of experience made tributary to its pages. It has the further conspicuous merit that the translation does not continually suggest the German phrase behind it, but, on the contrary, is uniformly simple and direct. This use of English construction is especially gratifying because of the striking contrast it offers with other recent translations from German works, in some of which the English is so involved and distorted by the retention of the German structure of the original as to be almost unreadable.

"Forest Protection," so runs the definition, "has for its object the security of forests against unfavorable external influences, as far as lies within the power of their owners," consequently the whole subject of forest law is outside the range of the present treatise. Within the boundary thus defined the attempt is made to lay the foundations of successful forest protection through a knowledge of the phenomena and causes of all possible damage, of all preventive and remedial measures, and of how to apply them. More than in any other similar book with which I am acquainted, the attempt has been made to facilitate original and independent study and decision by furnishing a sufficiently wide basis of acquaintance with the causes of injury.

Following upon the definition of Forest Protection and the description of its position in forestry there is a very brief and interesting notice on the historical development of Forest Protection, which traces it back to the religious care of sacred trees in groves. Later on forests were protected chiefly as the resting-place for wild game. A curious illustration of this point of view is contained in John Manwood's black-letter *Treatise and Discourse of the Lawes of the Forrest*, published in London in 1798, which is, I believe, the earliest English book on the subject. On page 15, which lies before me, he says:

And hereupon the Latinests haue framed this latin woord, Foresta, for a Forrest, being compounded of those two words, fera, and Statio, so that Foresta est ferarum Statio, which is, that a Forrest is a safe abyding place for wild beasts. And euen according to the same manner, imitating the Latinests, we haue framed this English woord, a Forrest, being compounded of these two words, For, and Rest: And because a Forrest is a safe abyding and priuiledged place for

the king's wild beastes for rest, which two woords (For and Rest) being put together and made one woord, is Forrest, or a Forrest, taking his name of the nature of the place, which is priuiledged by the king for his wild beastes, to have their safe abyding in for rest.

It should be added that a more recent philology derives the word "forest" from the Latin "fores," meaning "out-of-doors." But, although we have discarded Manwood's definition, both of the word and the thing it denotes, the traces of the view he represents still remain in the Scotch "deer forests," which often do not contain a single tree. Nor will it be apt to disappear even in this country while great game preserves, such as the Yellowstone National Park, continue to be of like conspicuous public service.

The question of boundaries, with which the book proceeds, is of comparatively little interest to us, because forest boundaries, such as are here in question, do not exist in the United States; but the second chapter, which deals with protection against avoidable damage in the use of the forest, is of direct value. The sections on bad felling and careless conversion are full of excellent practical advice, and, with a few additions and subtractions, would be models for use in this country. Among others less applicable the author recommends the following precautions, which are not only germane, but are deserving of widespread use in this country:

Measures for the prevention of mischief are: (1) Employment of competent and trustworthy woodcutters, and careful supervision of their work. It is generally advisable to employ the same men year after year, and to withdraw from the gang all those who fell badly, and encourage the best men by instruction and higher wages. (2) Throwing trees on to bare spots and not among young growth. (3) Careful felling of coppice with sharp instruments and with a clean and sloping cut. (4) Avoidance of throwing felled trees on to rocks, stones or other stems; felling uphill or sidewise, so that there may be a minimum of breakage.

Forest pasture is another practical matter intimately connected with the needs of forestry in the United States. Speaking of the damage done by goats the author says:

To take some out of the many instances of the destruction of forests by goats: In the Tyrol and southern Switzerland, and in the Himalayas, fine forests have been completely destroyed by them, and in Ajmere and Merwara, whose hillsides, where vegetation once flourished, have been laid almost bare, with nothing left but deformed, thorny shrubs. In France, since 1665, goats have been excluded from all forests managed by the State Forest Department, and no legal right can be enforced to graze goats in private forests, as the grazing of these animals is considered incompatible with the maintenance of the underwood.

It is true that conspicuous damage on a large scale has, so far, been done in the United States only by sheep, and that notably on the Pacific slope. Similar damage, longer continued, and, therefore, with far worse consequences, has taken place in the Alps of southern France. To this the writer does not refer, but the extent to which the summer pasturage of sheep was carried there may be gauged by the fact that flocks of fifteen to twenty thousand head were frequently driven into the mountains from the lowlands. Monsieur Boppe, the present Director of the French Forest School, mentioned in a lecture which I had the pleasure of hearing that one flock, which he had himself seen, occupied seventeen hours in passing over a bridge thirteen feet wide.

The third chapter, on Forest Offences, has only a potential interest here, and the same is true of the chapter on Forest Servitudes. It will be an enormous advantage when Government forest management comes to be introduced, that rights of user cannot accrue on the public lands of the United States. In India, on the contrary, nearly all of the Government forests were at one time burdened with these rights. At present they have been settled (which does not at all mean extinguished, but only limited and defined) on about 80,000 square miles of Government forest-land, while 50,000 more are still under settlement. With an annual budget of about eighteen million rupees, Mr. Ribbentrop,

the present Director General of Forests to the Government of India, estimates that the cost of prescriptive rights to the Forest Department is at least equal to that of its whole establishment. Yet, in spite of this fact, the forests yield an increasing net annual revenue, which now amounts to nearly three million dollars.

New York.

Gifford Pinchot.

Exhibitions.

Eleventh Annual Exhibition of the Architectural League of New York.—I.

POSTERS and book-covers, jugs, curtain-poles, hat-racks and burnt wood table-tops are not things of the highest intrinsic importance, and they have but the slightest connection with architectural art; yet, in this architectural exhibition, scores of things of these and similar kinds, and of designs for such things, have good places on the well-lighted walls of the galleries, while a series of very interesting park and garden designs, including some of the most important of Mr. Olmsted's recent works, are consigned to the walls of the entrance corridor, where they cannot be seen at all until the approach of evening commands artificial illumination. Moreover, while all the hat-racks and the poker-work and the American designs for Chinese rugs are carefully paraded in the catalogue, it makes no mention whatever of these valuable designs in the corridor. The Architectural League's Hanging Committee and Catalogue Committee seem to have united to declare what has often been said by outsiders—that almost every one in America knows the value of landscape and garden art better than the architects, who ought to be the foremost celebrators of its importance. Certainly the League cannot complain if the practitioners of this art refuse to contribute again to its exhibitions.

The most interesting thing in the whole exhibition, to the general public, and the most instructive, were it properly displayed, would be Mr. Olmsted's scheme for the permanent disposition of the quondam Fair Grounds at Jackson Park, in Chicago. It is a masterly piece of work in conception and in execution. The good sense, the imaginative force and the artistic skill shown in remodeling the features of land and water and the architectural elements bequeathed by the Fair, and forming them into a coherent, varied and beautiful lake-side pleasure-ground, are as great as those that were shown by the original transformation of a desert swamp into a sumptuous place of palaces. This design will soon be reproduced in the pages of GARDEN AND FOREST.

Among the other designs by Mr. Olmsted and his associates which have been relegated to the corridor's outer darkness are those for the grounds of Biltmore, Mr. Vanderbilt's place in North Carolina; for Auldwood, Mr. Hoagland's place at Seabright, on the sandy New Jersey coast; for Bleak House, Mr. Winans' place on the rocky shores of Newport; for Mr. D. Willis James' inland place in New Jersey; for the grounds surrounding the mansion which Mr. Hunt built for Mr. Ogden Goelet in the heart of Newport; for the grounds of Washington University, at St. Louis; for Seneca Park, in Rochester, and for South Park, in Buffalo. These form a remarkable series of varied works, showing many types of garden and park design from the almost strictly formal treatment appropriate on a small Newport place, where the house is an adaptation of a stately French château, to the markedly naturalistic treatment befitting a site like that of the Rochester Park, where water plays almost as prominent a part as land in the general effect. Had they been displayed as they should have been, conspicuously, in some position of especial honor, the League would have shown that it understood the meaning of art in the noble sense of the word, and realized the intimate relationship between gardening art and architectural art, and the public would have been interested and instructed as we cannot hope will now prove to be the case.

When the architectural designs in the galleries are studied the action of the two committees seems all the more inexplicable; for they reveal among our architects a growing sense of the need for gardening art in connection with all buildings which do not stand upon crowded city streets. Chief in importance, perhaps, is the elaborate design of Messrs. Carrère and Hastings for a large country house set at the end of a long narrow, rocky point projecting into Long Island Sound, and approached through a natural forest with which it has been united by formal gardening arrangements, conceived on a larger scale than has often been seen in this western world. This scheme, I hope, may soon be reproduced in these

pages; and likewise an interesting suggestion of Messrs. Bell & Langton's for the rearrangement of Madison Square in this city.

Many pictures of country houses, whether good or bad in themselves, gain interest by the incorporation of their environment in the architect's design. I do not mean that this environment is always better imagined than the house itself, or even as well imagined; merely that any proof that our architects are coming to realize the interdependence of the two arts is very welcome. One common fault is still the undue prominence of stretches of gravel in the vicinity of the main front of a house. Of course, it is often involved in the mistake of incorporating the carriage-entrance with this front. But there are instances where the carriage-drive runs to an entrance in another side of the house, yet, nevertheless, a gravel path cuts off the main façade from the lawn, not only offending the eye by its own barren line, but preventing any proper system of planting about the house to connect it integrally with the soil and give it an air of harmony, unity and repose. Summer days are few in our climate when a lawn is unfit to tread upon; and, to preserve its beauty and that of the house itself, other entrances than the one which should lead immediately to the grass might well be used upon these days. Messrs. Rossiter & Wright have grasped this idea in several excellent designs. A striking instance of too much gravel, necessitated in part by a faulty placing of entrances, is Messrs. Parfitt Brothers' "Three Houses at Hill Crest," No. 112. In their "House at Cedarhurst," No. 127, Messrs. Romeyn & Storer have drawn no gravel line between the main front and its lawn; but they have based the semicircular porch upon a wide rectangular stretch of flagstones, not even raised to form a terrace, which makes an ugly blot upon the lawn, and has not as much excuse in the way of possible convenience as a path.

No carriage drive reaches the door in the long façade of Messrs. Renwick, Aspinwall & Owen's "House at Baltimore," No. 148; but the straight path which approaches it, between two stretches of grass surrounded by low hedges, is absurdly broad—almost one-third the width of the façade. Apparently to relieve the barren effect thus produced, the centre of this path has been filled with a group of flower-beds, which, of course, as they are evidently out of place, merely add to its ugliness, and also interfere with the convenience of pedestrians. Equally bad, in another way, is Mr. A. P. Valentine, Jr.'s, "Plan of a House and Home Grounds," No. 179, where there is no grass at all, but a meaningless arrangement of multiplied straight-lined paths intersecting monotonous shrubberies; and still worse is Messrs. Jardine, Kent & Jardine's "First Study for a Country House near New York," No. 226. Here the large house stands upon a high terrace, and below this the foreground is filled with wide, contorted paths and large flower-beds of graceless and inharmonious shapes, encircling an oval basin of water which is not brought into any relation with the architectural lines beyond it. More ambitious and more interesting is Messrs. Snelling & Potter's "Sketch for a House at Tuxedo," where the disposition of the paths and drives is both sensible and pleasingly symmetrical.

In pleasing contrast with garden arrangements appropriate to our climate is the entrance path to a cottage at Burlingame, California, shown in a water-color drawing by Mr. A. Page Brown, No. 330. Among the distinctively rural structures which seem particularly good I may note Messrs. Wainright & Munoz's "Golf Club House at Seabright," No. 76, and Mr. Atterbury's "Model for a House on an Adirondack Lake," No. 373. This is an interesting example of a large house kept low, as is appropriate in the indicated situation, and built of stone and unhewn logs. It may be thought, however, that in the Adirondack woods a shingled roof would have more of the virtue of fitness than the tiled roof which the house now bears.

Several well-designed tombstones of a simple kind prove that we are gradually learning that it is not only large and costly memorials to our dead which demand an artist's care. Among them are Mr. Robert Brown's "Memorial Cross," No. 175, and the "John Hancock Memorial," No. 167, by Mr. Schweinfurth, the designer of the excellent simple tombstones, a series of which were published in GARDEN AND FOREST, vol. ii., p. 198. Very beautiful in a more elaborate way is the late Mr. Hunt's design for the Belmont tomb at Newport.

A dignified and wholly appropriate design is Messrs. Cady, Berg & See's "Memorial Gateway for Yale University," No. 339, with simple brick piers and delicate elaborate wrought-iron work. In a series of beautifully executed water-color drawings, Messrs. Howard & Cauldwell suggest a number of gateways for the new parks in the northern part of New York city. Their conceptions are excellent, in so far as the modest size and open, unobstructive air which should characterize the entrances to naturalistic parks are concerned. But the partic-

ular architectural style chosen for their piers and pillars seems less well imagined. Something more simply classical would be more pleasing to a cultivated taste and more in keeping with the general character which American architecture bids fair to develop, than these rather heavy, baroque, seventeenth-century motives. And a singular carelessness of the requirements of scale is seen in the same artists' "Birds'-eye Perspective of Proposed Park and Approach to Grant's Tomb," No. 181. It is a good idea that Morningside Park and the Riverside Drive should be connected at this point, and that in this way a dignified vista should lead the eye toward the tomb when approached from the east. The idea is well carried out by making a wide, straight avenue form each end of the approach, while halfway between the two parks it broadens out into an open space covering the area of four city blocks. But this area is designed by Messrs. Howard & Cauldwell in a way that would be appropriate to a small courtyard. The features they have selected are so few and of such a character that only after long study does the observer realize how wide the included area really is. Quite a different scheme, and one of many more parts, would be needed to give the space of four city blocks a suitable effect. And, by the way, our general ignorance in regard even to the nomenclature of gardening art is shown by the fact that this bald and strictly formal arrangement is called a "park."

In conclusion, it may be said that, while the drawings in this exhibition show a commendable growth in the desire to utilize the resources of gardening art, they prove that our architects have still a great deal to learn, not merely with respect to its right management, but also with respect to its ideals and the difference between its various branches. They prove how very wise it was, even in such a case as that of the Goelet place at Newport, where only strictly formal gardening elements were desirable, to combine the work of a landscape-architect like Mr. Olmsted with that of an architect like Mr. Hunt.

New York City.

M. G. Van Rensselaer.

American Carnation Society.

THE fifth annual convention of this progressive society brought together from various states the largest and most enthusiastic gathering of specialists in Carnation-culture which has ever met in this city. The Carnation has reached a leading place among commercial flowers, and there are, of course, novelties enough every season to tempt the most conservative grower who expects to keep his hold on the best market. Every year he sees fine profits made by some enterprising growers of kinds which take the popular fancy while the old kinds are scarcely paying the coal bills. Little wonder, then, if the Carnation exhibition which was held at the Grand Central Palace, in connection with the annual meeting, had very much the air of a speculative exchange, only the beautiful flowers softened what otherwise would have been its hard business aspect. There were many thousand flowers on the tables, but, as is usual in trade exhibitions, in not a great number of varieties. All the favorite varieties were shown in great profusion, and generally in the finest possible condition, except, possibly, the favorite Daybreak, which, curiously enough, while most plentiful, was in no single instance up to its best condition. Of previous introductions Bridesmaid took the honors for best pink; Storm King was the best white shown, and Meteor, Helen Keller and Bouton d'Or were the best of their respective colors, and all well shown. The most striking novelty for 1896 was Della Fox, a seedling from Myers & Santman, Chestnut Hill, Pennsylvania. This is said to be a cross between Grace Wilder and Daybreak, and is a most captivating shade of pink of the Daybreak quality, but much darker than that popular kind. In size, form, habit, etc., Della Fox apparently left nothing to be desired.

The exhibit of Mr. Hill, of Richmond, Indiana, was the centre of interest, as it comprised mostly novelties finely grown and most beautifully shown in masses tastefully set up in large vases. Mr. Hill's Jubilee has been seen here before, and it is likely to take the lead among the dark scarlet flowers. Abundance (1896) is a deep pink with rather short stems, and likely to be valuable for its freedom, especially when grown outside. Triumph, which is a purer pink, is thought to be very promising and of a high class. Armazindy is a scarlet flake of the largest size, hardly as refined as Helen Keller. Mr. Hill received a certificate for Flora Hill, a grand white, which has been grown three years, but is not ready for the market. The judges also gave a certificate and ninety-two points for Mrs. McBirney, a fine flower of the Daybreak order. Mr. J. N. May, being a judge, had nothing in competition, but made a most tasteful and attractive display of Mrs. Pierpont Morgan Roses, flanked by handsome Carnations, of which Maud Dean, when

offered, is sure to meet with favor as a fancy distinct variety of the first class, it being a dainty pink with depth of darker color at base of the petals. For a darker pink none seems to us more pleasing than Mr. May's Lena Saling, inclining, as it does, to the salmon. It is of great diameter, but not very deep. Peter Fisher, of Ellis, Massachusetts, exhibited the greatest variety of seedlings, and received honorable mention for Edith Foster, a promising white.

In spite of the numerous varieties of the Carnation, many of which to the layman seem much alike, there is room for others, for, after all, there are very few which, like William Scott and Daybreak, will grow in every soil and for every one.

Notes.

Strawberries, from Florida, are selling at the reasonable rate of fifty cents for a quart of well-grown fruit, and more delicate strawberries from near Charleston, protected under glass without any artificial heat, sold on Monday for \$1.00 a box at wholesale. No better oranges are ever offered here than some of the last Jamaicas, now being sold at fifty to seventy-five cents a dozen. The last of the Jamaica grape-fruits will soon be followed by the earliest of this fruit from California.

The Smooth Brome Grass, *Bromus inermis*, of south-eastern Europe, is commended in a recent bulletin of the South Dakota Experiment Station as a valuable grass in that state, both for permanent pastures and for meadows. Other grasses at their best may give a better quality of hay, but none has been tried there which yields as good a return one year with another. All kinds of stock eat this Brome Grass readily, and an aftermath springs up immediately after it is cut, so that it makes good grazing for fall and early winter. It is hardy against cold and has great drought-resisting powers and is one of the very earliest grasses to start in the spring.

Four species of *Eucalyptus* in New South Wales are called Ironbark, the best of which is the so-called White or Gray Ironbark, *E. paniculata*. This wood is very heavy and hard; its most characteristic property, however, is a certain gumminess; when planed it shows more or less parallel lines of close fibre which resemble horn, and between these in the parts where the grain is more open are shallow pits filled with a resinous substance. The best Gray Ironbark is very pale, and can hardly be excelled by any wood for its combined strength and durability. Railway ties made of this wood, which have borne the heaviest traffic of the main line near Sydney for twenty-five years, are said to be as sound as they were when they were laid.

No insects are more dreaded by the general farmer than wire-worms, and we are glad that Mr. M. V. Slingerland has republished the essential parts of a bulletin, now out of print, which gave a detailed account of three years of experiments with these pests. A few recent observations are embodied in this new bulletin, so that the information is brought up to date. The practical summary of the whole is that there is no reliable way of protecting seed by poison or of destroying immature wire-worms in the soil. But the life-history of these worms shows that they live for three years at least in the larval state, and when fully grown they change to soft white pupæ in July, and the insect assumes its adult form in August. Singularly enough, the insect remains in the cell until the following April or May—that is, nearly an entire year—and they perish whenever the soil is disturbed so as to break these earthen cells. Of course, this indicates that if infested fields are plowed after the 20th of July, thoroughly pulverized and kept stirred up, many of these cells will be broken and the tender beetles destroyed. Wheat or rye may be sown after this cultivation. Farmers who practice a short rotation of crops and fall plowing will not be troubled seriously with wire-worms.

The windows of the flower shops have a suggestion of the Lenten season in their less rich and profuse dressing with simple blossoms for home use, instead of the more brilliant and gay flowers used for public social functions. The one striking decoration in the up-town Broadway establishments early this week was the large section of a tree, bare and wintry-looking, draped with Florida moss, the rich chrome and greenish gray of bark and moss, enlivened by luxuriant long sprays of *Bougainvillea*, all illuminated by tiny electric lights. This particular window held, with other flowers, a varied collection of choice Orchids, but, as a rule, the kinds of flowers which appeared most abundantly suggested the garden and meadow and woodland rather than the greenhouse and conservatory. Tulips of various colors and narcissus of many forms were

most plentiful and sold for \$1.00 a dozen. Roman hyacinths were among the most popular flowers. Dutch hyacinths showed the effect of the season in the unprofitable price of fifty cents a dozen, and freesias were plentiful at thirty-five cents a dozen. Four or five branches of lilacs, each carrying two panicles, cost \$1.50, and a tight little nosegay of large single California violets the same price. A bunch of forget-me-nots, the winning little flowers peeping from luxuriant stems and foliage, could be had for fifty to seventy-five cents, and a dozen stalks of lily-of-the-valley brought but seventy-five cents.

Mr. B. E. Fernow, in an article in *The Independent*, to show that permanently good roads are an important element in any rational system of forestry, cites the example of the little city of Goslar, in the Harz Mountains, of Germany. This old town owns a forest of 7,500 acres, which the citizens treasure as one of their best investments, because it not only furnishes them outing grounds and good sport in the way of hunting, but with a sure and continuously increasing revenue. Under conservative management the annual cut is 350,000 cubic feet of wood, and the net income from the sale is, in round numbers, \$25,000 a year, or \$3.50 an acre a year, which is a good return from soil unfit for agriculture. Formerly the district was without good roads, but in 1875 the forest manager persuaded the city fathers to appropriate enough money to construct a first-class road system, which was gradually completed. In 1891, \$25,000 had been spent on roads, and 141 miles of these roads were in good order. The manager kept an account of the influence of this improvement on the profits and cost of his forestry operations, and he was able to show that the annual cost of logging had been reduced by \$2,450, the cost of hauling by \$2,520, and the result of the sales due to the fact that much formerly unsalable material could now be disposed of and all could be transported more conveniently was increased by \$3,255, being a net increase of \$8,255, or nearly thirty-three per cent. of the amount invested in road improvements. On one road which was macadamized and maintained for a year at a cost of \$7,440 an instructive comparison was made between the cost of hauling 470,000 cubic feet of wood over the old and over the new roads. On the old road 4,273 loads were required of 110 cubic feet each, and costing \$3.60, or amounting in total to \$15,282.80. On the new road the same quantity was moved in 2,652 loads of 177 cubic feet each, and the cost, at the same price a load, was \$9,547.20, which means that the saving in haulage alone was \$5,735, or seventy-five per cent. of the cost of the road in one year.

Among many sorts of fresh vegetables now in the regular stock of first-class dealers is asparagus from Missouri, which costs forty cents for six long white shoots, while the best from South Carolina costs \$2.75 for a generous-sized bunch, and a dozen long green stalks from hot-houses in Illinois bring \$1.10. Cauliflower is coming from near-by hot-houses, Florida and France, and costs fifteen to fifty cents a head. New peas, from Florida, the pods small, but well filled, cost ninety cents a half-peck, and well-grown string-beans from the south command thirty cents a quart. Okra, from Cuba, costs ten cents a dozen, and egg-plants, from Florida, bring twenty-five to thirty-five cents each. New beets come from Florida and Bermuda, a half-dozen bunched with the tops costing ten cents, and loose ones fifteen cents a quart. Kohl-rabi comes from the same localities, and cost fifteen cents for three. Tomatoes, from Florida, firm and well ripened, bring twenty-five cents a pound, the hot-house product from Pennsylvania costing forty cents. Tender radishes from near-by hot-houses may be had for seven cents a bunch, and rhubarb, grown under glass on Long Island, for ten cents. The supply of celery is partly drawn from Florida. Rochester furnishes some which is better blanched than that from the south and of sweeter flavor, while that from California is entirely white and brings seventy-five cents to \$1.50 for a dozen stalks. New cabbage, from Florida, is not yet plentiful and costs twenty cents a head, that from Germany bringing half this price. Parsley comes mainly from Bermuda at this season. Dandelion, from Boston and near-by hot-houses, costs twenty-five cents a quart; Romaine lettuce, from Bermuda, fifteen cents a head; hot-house lettuce, from Boston, ten to fifteen cents, and larger heads, from Florida, ten to twenty cents each. Heads of chicory, with blanched centres, and the broader-leaved Escarolle cost fifteen cents each, while importations from France, the large heads fresh as though just gathered, command twenty-five cents. Mushrooms bring ninety cents a pound. Hot-house carrots cost five cents a bunch, and those from Bermuda seven to ten cents, and hot-house cucumbers from Boston are a luxury at thirty to thirty-five cents apiece.

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Farming on Vacant City Lots.

DURING these times of agricultural depression the profits realized by farmers, even under the best conditions, are meagre enough, and, therefore, when Mayor Pingree, of Detroit, first conceived the idea of utilizing vacant city lots for the growing of potatoes by the unemployed of that city—that is, by men who were generally quite ignorant of the theory and practice of cultivating the soil—the experiment was looked upon as visionary, if not ridiculous. The result of the first year's cultivation, however, which enabled nearly one thousand families to support themselves through the winter by their crops alone, stimulated certain public-spirited citizens of New York to make a similar effort here, and the result is published in No. 1 of the periodical *Notes*, published by the New York Association for Improving the Condition of the Poor. Of course, the philanthropic aspect of this experiment is the one of prime importance. The result proves that many persons who own vacant land would prefer to have it cultivated instead of lying idle and unproductive, and that a very limited area will suffice to raise enough vegetables to contribute largely to the support of a family through the winter. It proves, too, that very many of the destitute people in tenement-houses are willing to work and can be made to support themselves with a very little help advanced as a loan. Besides this, the project offers a natural plan for giving to the people who dwell in stifling tenement-houses opportunity to work for themselves in the open air and under healthful conditions. It gives mothers the advantage of taking their children out of the heated houses and giving them a taste of rural life. It enables the superannuated and partially crippled to support themselves. In addition to these advantages, the entire scheme has a substantial business basis, with none of the odious and depressing suggestions of a charity.

Naturally, however, the educational side of this vacant-lot farming will have a special interest to readers of a journal devoted to the art of cultivating the soil. Whatever is the fundamental reason for the widespread discontent with rural life now prevalent, for the general exodus from the country to the town, for deserted farms and the depre-

ciation in the value of land, every one admits that the one thing needed to insure a living profit from the cultivation of the soil is greater skill and higher intelligence applied to agricultural practice. A very striking proof of this is given in another leaflet published by this same association, and entitled *An Inquiry into the Causes of Agricultural Depression in New York State*. An observing agent—a Pennsylvania farmer named J. W. Kjelgaard—was employed to travel through the agricultural districts of New York for the purpose of making inquiries and reporting on the various phases of this problem, and he observed a singular air of prosperity in the farms about Ithaca which he had not met with elsewhere. The reason for this was discovered to be that an agricultural experiment station was in the centre of this fortunate area. This is a significant fact, and Mr. Kjelgaard reported that all farmers agreed that the station was an obvious help to them. He found, too, that a hundred miles from Ithaca one man who had taken a course of agricultural training at Cornell University was carrying the benefit of his knowledge to his neighbors, so that they were plainly profiting by it. Correspondence with the other stations brought out the fact that the stations were all bearing excellent fruit in this direction. Farmers in distant parts of the state not only write to inquire as to the best methods of cultivation of particular crops, and how to ward off the ravages of disease and insects, but they actually come to the station in considerable numbers to see and to learn.

In every city where this vacant-lot farming has been successful the soil has been cultivated in accordance with the teachings of science. The original ignorance on the part of some of these tenement-house farmers as to the simplest principles of plant structure and plant growth was almost pathetic, but pains were taken to show them how land should be broken up, how the fertilizer should be used, how the seed should be sown, and how the plants should be set, with the reasons for these operations. Every process from the very beginning to the end was carefully supervised, so that this vacant-lot farming, apart from its direct pecuniary profit, had a much more important function as a school of agriculture. It not only furnished healthful and profitable work for a great many people, but it gave these same unskilled people an opportunity to use their minds; it encouraged thought and aroused sluggish intellectual processes. These people are actually learning a trade, an honorable and profitable trade, and learning it in the best way possible. A man who raises half an acre of potatoes and early vegetables under wise direction need no longer call himself unskilled, and it is his own fault if he is shiftless. It may be added that these tenement-house farmers learn a great many things besides the mere cultivation of land. They learn, for example, how to sell—that is, how to transact business in the most effective way. Of course, potatoes and vegetables sold from a miniature farm at wholesale prices would not pay ordinary wages. But the potatoes, instead of being sold by the barrel, are, in many instances, handed out by the quart and half-peck at the best retail prices. In this way these small farmers learn the value of quality in their products. They find that they can take a bunch of choice radishes, freshly picked from the ground and carefully put up, and sell it for five or six cents when the market rate is only two or three cents. The quality of some of the products of this experiment may be estimated by the fact that the second prize at the late Live Stock Show in this city was awarded to the potato exhibit from these vacant-lot farms.

We cannot but assume that many of these tenement-house farmers who have had the advantage of this year of schooling will discover that there is a happier and wholesomely life for them outside of the congested districts of great cities. It would not be surprising if some of the graduates of these schools, who have learned to make a livelihood by truck-farming, should go into the rural districts and instruct farmers in their own calling. Now, it is the ambition of the country boy to get to the city, while the

inhabitants of even the most crowded city districts have an absolute antipathy for the country. If this system can be made to work in one or two cities, why should it not be made to work in all, and why may we not hope that if this practice is adopted generally and intelligently in different cities that this will prove the beginning in a small way of the return from the city to the country? And if, under capable instruction, agriculture can be made profitable in city lots, and if the good example of experiment stations is visible in better farming all about them, why should not actual instruction in agriculture be made a part of the curriculum of rural common schools? It certainly is not too much to hope that we can have advanced dairy schools in the grazing districts and experimental instruction in fruit culture, or in truck-farming, or in any other branches of agriculture in the locations best adapted to each.

We have only touched upon a few of the points which are suggested by this instructive pamphlet, which is published in this city at 105 East Twenty-second Street, and can be bought for ten cents. No public-spirited man or woman can read it without feeling that a new and promising outlet for philanthropic activity is here presented, while any one interested in the cultivation of the soil will find here subject-matter for reflection and a new and striking proof of the value of intensive farming. The illustrations, from photographs of natural scenes, are a most helpful addition to the text, which, it may be added, is a clear, straightforward and forcible piece of work from a literary point of view.

Rate of Growth of Loblolly Pine.

THE rate of growth of Loblolly Pine, *Pinus Tæda*, may be fairly indicated by the analysis of 47 individual trees, which were selected for the study in the Division of Forestry on various sites within the geographical range of the species. The comparison of the growth of Loblolly Pine on sites of different descriptions also throws some light upon the silvicultural requirements of this species, and suggests forest conditions favorable or unfavorable to its development.

HEIGHT GROWTH.—The height growth of Loblolly Pine is very vigorous. For the first 10 years it reaches a height from 18 to 20 feet, thus producing from 22 to 23 inches annually. The second decade seems to be the period of most rapid height growth, during which period the annual accretion gradually increases and reaches the maximum between the 15th and 20th year, that maximum being somewhat more than 24 inches. With the third decade the annual accretion begins to lessen, though the height growth is still vigorous, and gives an annual increase from 15 to 16 inches. A tree 30 years old is 50 feet high. From the 30th year the decrease in the height accretion becomes more noticeable; for the next 20 years the stem lengthens only by 20 feet, or by an annual increase of only 12 inches. A tree 50 years old will be 70 feet high. From this age the annual height growth decreases considerably, being nine inches for the sixth and seventh decades, and six inches for eighth and ninth decades. Thus a tree at the 90th year of its age reaches a height of 95 feet. At this age the Loblolly Pine actually reaches its full height growth, for the height accretion after 90 years becomes in most situations insignificant, and does not exceed more than from three or four inches annually.

Though such a rate of growth in height may be looked upon as a rapid one, still we learn from the analysis of the individuals taken from sites of better descriptions that the capacity of this species is considerably greater than that shown by the average of all the trees analyzed; for which the forest conditions, to be sure, were far from being favorable ones in all cases. We find among the trees measured one 36 years old with a height of 77 instead of the 56 feet average. The excess of 21 feet is due to the more favorable conditions under which it grew. The tree was taken from a grove of the same age and size, and dense enough

to keep the individuals constantly in a struggle for light, forcing them to lengthen their boles and to lift their crowns above the others. Another tree taken from young growth of Long-leaf Pine mixed with Loblolly Pine reached in 44 years a height of 76 instead of 65 feet. We find also in the tree records two individuals 100 years old, with a total height of 118 instead of the average 98 feet. These instances show that the height growth of Loblolly Pine could be considerably increased by proper care.

DIAMETER GROWTH.—The stage of most rapid diameter growth of Loblolly Pine occurs in the first 10 years, during which it forms a stem of two and a half inches at breast height (bark excluded). The second decade shows a decrease to 2.3 inches, the third to 2.2 inches, the fourth to two inches; a tree 40 years old would, therefore, be about 10 inches in diameter at breast height, including the bark. The diameter accretion continues to decrease with age, being 1.8 inches for the fifth, 1.6 inches for the sixth and 1.5 inches for seventh decade. A tree 80 years old at breast height is 17 inches in diameter, including bark. From the 80th to 100th year the diameter increases with two inches, and the average accretion for the 10th decade becomes less than one inch. The diameter growth of Loblolly Pine, then, follows the same law which was observed for Long-leaf Pine—that is, the diameter accretion invariably decreases with age, while the area accretion remains almost the same. From the table of growth given below it is seen that, with the exception of the first three decades, the areas formed on the cross-sections for each of all the successive decades are almost equal, while the width of the rings changes gradually from two and a half millimeters, which is the width of a ring for the fourth decade, to 1.2 millimeters, which is the width of a ring of the 10th decade. This law has a biological significance. It shows that the mass increment, allotted to each of the stages of growth into which the tree development may be divided, is equally distributed over the years constituting the period. The successive layers being spread over a larger surface area are, therefore, successively thinner. The value of this law will be more appreciated if looked at from a practical forestry point of view. It establishes a definite relation between the area accretion and the number of years required for its formation; it says that the ratio between them is a constant one. This constant factor may be obtained from the analysis of a large number of trees, and once determined, it may be applied in anticipating the average diameter dimensions of a tree at any given age, for then a simple multiplication of the factor and age is required to establish the area, and hence the diameter for that age. The knowledge of the dimensions of a tree at any given age, and hence the knowledge of the future yield and increment of the forest at any given period of its life, is the corner-stone on which forestry economy bases its financial calculations.

MASS ACCRETION.—The rate of volume growth of Loblolly Pine is subjected to the law observed to be true with regard to all other species. It begins comparatively slow, increases gradually with age until it reaches its maximum point, remaining at that point for a few years, then enters into a stage of growth where the volume accretion becomes smaller again. From the table given below it is seen that Loblolly Pine produces for the first 50 years 25 cubic feet and grows with an average annual accretion of half a cubic foot. For the next 25 years it produces as much as for the first 50 years. A tree 70 years old has a volume of 49 cubic feet. From the 70th to the 100th year the volume accretion equals 40 cubic feet, and the total volume of a Loblolly at 100 years is 89 cubic feet. In the table is shown the increase of volume for every 10 years. Examining the last two columns of the table it will be seen that while the current accretion, passing its maximum point in the ninth decade, begins to lessen, the average annual accretion still increases, approaching its maximum between 100 and 110 years. By that time the average annual accretion will become equal to the current accretion; that signifies, as we already know, that here Loblolly Pine reaches

the stage of its maximum growth, and the rotation for maximum production would lie between 100 and 110 years. It may be said, unhesitatingly, that Loblolly Pine is a rapid-growing species. It produces in 100 years wood almost double the amount of that of Long-leaf Pine; it grows well under the conditions in which we find it now; it grows better on sites of better descriptions; it requires a good deal of moisture; it needs plenty of light and is sensitive to light conditions, especially when it is approaching the state of maturity; it does better when mixed with other species than when left to itself.

RATE OF GROWTH OF LOBLOLLY PINE.
(Published in advance by permission of the Division of Forestry.)

Age.	Diameter with bark (breast-high). Length at log with upper diameter of live inches.		Height of tree.		Volume.		Periodical accretion.						Average annual accretion.	Current accretion.
					Tree.	Log.	Decade.	Diameter.	Height.	Area of cross-section.	Volume.			
	Ins.	Feet.	Feet.		Cubic feet.	Cubic feet.		Ins.	Feet.	Sq're feet.	Cubic feet.	Cub. feet.	Cub. feet.	
10	3.4		18		0.6		1st	2.5	18	0.03	0.6	0.06	0.06	
20	5.6		37		3.0		2d	2.3	19	0.08	2.4	0.14	0.24	
30	7.8	23	50		8.7	7.5	3d	2.2	13	0.14	5.7	0.29	0.57	
40	10.0	35	61		16.6	15.4	4th	2.0	11	0.17	7.9	0.41	0.79	
50	11.8	44	70		25.3	24.1	5th	1.8	9	0.19	8.7	0.51	0.87	
60	13.3	52	78		35.6	34.5	6th	1.6	8	0.19	10.3	0.59	1.03	
70	15.5	60	85		49.0	47.8	7th	1.5	7	0.21	13.4	0.70	1.33	
80	17.1	68	90		62.4	61.4	8th	1.4	5	0.21	13.4	0.78	1.34	
90	18.7	76	95		78.0	77.1	9th	1.1	5	0.19	15.6	0.87	1.56	
100	19.5	80	98		89.4	88.5	10th	0.9	3	0.16	11.4	0.89	1.14	
110	20.2	83	100		96.0	95.2	11th	0.8	2	0.13	6.6	0.87	0.66	

Among the trees analyzed we note a few which found all the requirements of this species necessary for rapid development. Tree No. 216, 101 years old, was taken from a young growth of Long-leaf Pine, with the scattering mature Loblolly Pine. Tree No. 297, 100 years old, was taken from a moderately dense forest of Pinus Tæda, mixed with Cuban Pine, Liriodendron, Magnolia, Laurel Oak, with an undergrowth varying in density, of Red Bay and Andromeda.

RATE OF GROWTH OF THE TWO BEST LOBLOLLY PINES.

Age.	Height.		Diameter with bark (breast high).		Volume.	
	Tree No.		Tree No.		Tree No.	
	26	297	26	297	26	297
	Feet.		Inches.		Cubic feet.	
10	20	20	5.2	5.2	1.3	1.3
20	48	50	8.0	10.2	8.2	13.6
30	60	70	10.4	13.8	18.0	31.4
40	73	80	13.0	17.6	32.0	42.8
50	85	88	15.0	20.0	51.1	61.4
60	90	95	17.0	22.8	69.5	87.7
70	95	100	19.0	24.8	91.6	109.1
80	100	105	20.4	26.2	112.3	123.8
90	105	112	21.6	27.4	129.7	147.8
100		118		28.6		167.3

Tree No. 26, 92 years old, was taken from an open forest of Loblolly Pines, intermixed with various Oaks and Gums, with a dense undergrowth of the deciduous species named. In all cases there was a sufficient supply of moisture; in all cases the forest was a mixed one, and the different species, due to difference in age and habits, formed a canopy of varying height, a roof of two, three or four stories. Each story had its favorable influence: the first, formed by the undergrowth, protected the ground from the burning sun; the second and the third shaded the trunks and cleared off

the limbs of the taller trees, whose perfectly free crowns received all the light necessary to make them thrifty. The dense position of the many trunks of all species constituting the forest checked the winds, preventing the litter, the manure of the forest, from being blown away and the moisture from being rapidly evaporated. The rate of growth of the favorites is remarkable in consequence. Tree No. 216, 101 years old, formed 167 cubic feet in a trunk 111 feet high and 26 inches in diameter at breast height. The second table gives the progressive development of the diameter, height and volume growth of trees No. 26 and No. 297.

Comparing these figures with those given in the table of average rate of growth, it will be seen that Loblolly Pine for the first 50 years, if properly managed, would produce double the amount of wood which it produces under the usual natural conditions. It will be seen that for 65 to 70 years Loblolly Pine could form a trunk of the same dimensions, with the same amount of merchantable timber, as that which it forms now in 100 years. The rotation consequently could be brought down to the 70th year. In other words, by the employment of knowledge and skill, each dollar could have been realized 30 years earlier and could have earned in the 30 years, at three per cent. compound interest, \$1.42, which is lost by the absence of forest management.

Washington, D. C.

A. K. Mlodziansky.

Foreign Correspondence. London Letter.

ADONIS AMURENSIS.—This interesting plant was described and figured in Regel and Herder's *Plantæ Raddeanæ*, and in a Japanese work, entitled *Fuko Juso Shin Dsu*, there is a series of no less than twenty-one colored figures representing distinct varieties and showing that this species must have long held a prominent place among garden-plants in the far east. There are double and single flowered varieties, others yellow or greenish yellow, or orange or bright red. Plants of a yellow-flowered variety are now flowering in the rock-garden at Kew, probably for the first time in Europe. In habit this species resembles *Adonis Pyrenaica*, but it differs from that species in not having hooked achenes. The flowers on the Kew plant are yellow, over an inch across and not unlike those of the common *A. vernalis*. The leaves are comparatively long-stalked, loose and finely cut, suggesting the leaves of a Carrot. It is possible that some of the bright-colored varieties of *A. Amurensis* have been introduced from Japan into American gardens, but, so far as can be ascertained, they have never been grown in England, and, judging them by the pictures in the Japanese work above named, they are well worth a place in the garden to flower in early spring.

LEUCOJUM CARPATHICUM.—This name was given by Herbert to an exceptionally large-flowered variety of *Leucojum vernum*, the Snowflake which grows wild in the south of England, and is one of the most charming of the early harbingers of spring in the garden. Plants of the former were exhibited this week by Mr. Ware, the Tottenham nurseryman, and were awarded a first-class certificate by the Royal Horticultural Society. The leaves are broader, the scapes taller and the flowers about twice as large as in the type, and as each scape bore two flowers the effect of a tuft of plants in bloom was exceptionally pleasing. The nodding bell-shaped flowers were over an inch in diameter and white, with a conspicuous spot of bright green near the tip of each segment.

GALANTHUS ELWESII, var. F. FELL.—This is an unusually large-flowered variety of the king of Snowdrops, but I have seen plenty quite as large among the millions of this plant that stud the lawns, borders and wild gardens at Kew. It is impossible to speak too highly of a plant which is almost dirt cheap if procured from big dealers, and which can be dibbled into lawns and borders by boys to produce a dis-

play of flowers for a month or more in the dawn of the year.

IRIS STYLOSA.—This beautiful and deliciously fragrant Iris has been flowering freely in the open air at Kew since the middle of December, and is likely to keep on till well into the spring. Planted against the south wall of a greenhouse, with its roots pressing against the bricks, it has formed dense tufts of elegant linear leaves a foot or so high, and rising among or above these are numerous flowers of a lavender-blue, blue-purple or white color, and varying in size from four inches to two inches in diameter. There are some half a dozen named varieties, all beautiful, all very fragrant, and a bunch of them in a vase in a room in mid-winter is in every sense a delight. They last three or four days if cut just as they are unfolding, and they are produced in such abundance that half a dozen plants will keep up a constant supply of cut flowers if the weather be not too severe. Although an old species, this Iris is comparatively little known, probably because it will not thrive away from a south wall. The Kew plants were placed in their present position as an experiment, and it has proved a perfect success. The species is wild in Algeria, and I believe it is grown by the Scilly nurserymen. I see it is called *L. unguicularis* by Mr. Baker.

BLUE PRIMROSES.—A purple-blue-flowered sport from the common Primrose, *Primula vulgaris*, has for several years past been in the possession of Mr. G. F. Wilson, of Weybridge, but it has lately passed into the hands of Messrs. J. Veitch & Sons, who now hold a fine stock of it, and by whom a large batch of it was shown at the Royal Horticultural Society's meeting this week. In foliage, vigor and floriferousness the blue-flowered variety does not differ from the type, and it grows freely out-of-doors wherever the common Primrose thrives. The plants shown had been lifted from the open ground and planted in five inch pots, each with a tuft of rich green leaves and from twenty to thirty open flowers. The color varied from a rich purple-blue, nearly true blue, in fact, to deep purple and lavender, a ring of yellow or red occurring at the mouth of the tube in some of the varieties. I learn from Messrs. Veitch that about twenty per cent. come blue from seed. A sentimental objection was raised to a blue Primrose because it was said a Primrose should be yellow, but I am of opinion that these blue Primroses will become popular for the garden in spring.

CYRTANTHUS PARVIFLORUS.—This species was described by Mr. Baker in 1891 from specimens flowered in England and others collected in the Transvaal. A beautiful example of it was shown at the Drill Hall this week by Mr. Woodall, of Scarborough, who grows it in a cool greenhouse, where it is as floriferous and free as *Cyrtanthus Mackenii*. The genus may be divided for horticultural purposes into two groups, namely, one represented by *C. Mackenii*, *C. lutescens* and *C. parviflorus*, which are as easily managed as *Lachenalias*; the other, represented by *C. rectiflorus* and *C. Macowani*, which are beautiful in flower, but difficult to cultivate. The addition of *C. parviflorus* to the easily managed lot is a decided gain. It produces leaves and flowers together, the former being bright green, linear and a foot long, the latter in elegant umbels of about a dozen borne on scapes eighteen inches long; each flower is tubular, an inch and a half long and colored bright scarlet. The plant was well worthy of a first-class certificate. I can recommend this for its red flowers, *C. Mackenii* for its white and *C. lutescens* for its yellow flowers, as good useful greenhouse plants.

LACHENALIA NELSONI.—When well grown this is one of the most useful of all spring-flowering bulbous plants for the greenhouse. It was raised by the gentleman after whom it is named about twelve years ago from *Lachenalia aurea* crossed with *L. tricolor*, and it combines the best qualities of both. In the garden of Lord Suffield, Gunton Park, Norwich, it is grown better than usual, a group of plants sent by him to the Drill Hall this week exhibiting excellent cultivation. They were in six-inch pots, which were almost hidden by

the drooping foliage, and each pot contained from twenty to thirty scapes a foot high, and each bearing about twenty expanded flowers of a deep glistening yellow color, the few globose buds at the apex of each scape being colored bright red. I told the story of *Lachenalias* and their cultivation in GARDEN AND FOREST about a year ago. They are of that class of plants which are apt to be overlooked by cultivators or discarded as weedy and unsatisfactory through initial failure with them. When once understood, however, they are very easily managed and they are worth growing for the supply of cut flowers in early spring.

THE GARDEN CINERARIA.—A few months ago a spirited discussion was carried on in several scientific journals with reference to the origin of the popular greenhouse *Cinerarias*, some authorities holding that they are the product of several species crossed in the early part of the present century, while others held that, although there was no evidence of a hybrid origin in the plants themselves, there was plenty to show their close relationship with the annual *C. cruenta* of the Canaries. To test the two theories, *C. cruenta* was crossed at Kew with the garden *Cinerarias*, a similar cross being made by Messrs. Veitch. The plants obtained are now in flower at Kew and in the Chelsea nursery, and some of the latter were exhibited this week under the name of *C. Langleyensis*. There is no essential difference between these and the common garden kinds; indeed, beyond being a few inches taller and having flowers a trifle smaller and looser, they do not differ at all. On the other hand, a cross between the garden *Cineraria* and *C. L'Heritieri*, the other hypothetical parent of the garden race, is now in flower at Kew, and this is widely different in habit and flowers. Here we have strong evidence of a negative character in support of the view that *C. cruenta* is the sole parent of the garden *Cineraria*.

London.

W. Watson.

New or Little-known Plants.

Nolina recurvata.

A SPECIMEN of this south Mexican Liliaceous plant in Professor Sargent's garden, in Brookline, near Boston, has flowered this winter, this being the first time that this species has flowered in the United States, so far as we have been able to learn. In September, 1861, a plant in the garden of Monsieur Beaucarne, at Eename, in Belgium, produced a panicle of staminate flowers. This is the only other case we find recorded of this species flowering in cultivation, although, as it was introduced into Europe in 1845 by Van der Maelen, of Brussels, and widely disseminated in gardens many years ago, its flowering in those of southern France or Italy may not be an uncommon occurrence, especially as an allied species, *Nolina longifolia*, frequently blooms on the Riviera.

Nolina is a genus of about a dozen species distributed from the south Atlantic states and Texas to southern Mexico and Lower California, distinguished by its arborescent or abbreviated caudex, elongated unarmed leaves, and polygamo-dioecious flowers produced in loosely racemose or compound panicles with lanceolate bracts and bractlets. The flowers are small, greenish white and articulated on slender pedicels in one to four flowered clusters; the perigone is campanulate and composed of six nearly equal spreading oblong-ovate segments; the stamens, which are usually described as shorter than the segments of the perigone, are in *Nolina recurvata* nearly twice as long; they are inserted on the base of the segments, and composed of tapering filaments and ovate or oblong versatile anthers attached on the back, and in the pistillate flower reduced to anantherous staminodia; the ovary, which in the staminate flower is abortive or wanting, is sessile, three-celled, with three nearly sessile or short-stalked stigmas and two ovules ascending from the bottom of each cell. The fruit is thin and dry, usually three-winged, indehiscent, although

sometimes bursting irregularly at maturity, one to two celled, with an obovoid or globose seed in each cell.

Of the dozen species of *Nolina* which have been described by botanists at least nine inhabit the territory of the United States, including the type of the genus, *Nolina Georgiana*. Of the United States species nearly all are stemless or form short thick stems rarely more than three or four feet high, but *Nolina Bigelovii*, of the mountains of

the life histories, specific characters and distribution of *Nolinas* remarkably little is yet known, considering the length of time some of the species have been cultivated and their value as decorative plants.

The flowering plant of *Nolina recurvata*, whose portrait appears on this page, is one of a pair imported from Belgium nearly twenty years ago. It is four feet ten inches in height from the surface of the soil to the base of the crown of leaves. The stem is two inches in diameter at the apex and twenty inches across the bottom of the bulb-like base, and is covered with pale rugose bark. The leaves are lanceolate, gradually narrowed from the broad clasping base, thin but very tough, nearly three feet long, three-quarters of an inch wide near the middle, where they are broadest, dark green and lustrous except at the apex, which is brown and scarious, conspicuously veined, and roughened on the pale margins with minute serratures, closely imbricated, and pendulous. Early in December the pale yellow glabrous panicle appeared, and was fully grown at the end of six weeks, when it was four feet high, with a stout peduncle furnished with leaf-like bracts nearly two feet long, and slender branches slightly angled above, flattened below, twelve or fourteen inches long, and produced from the axils of leaf-like bracts, clasping, white, and more or less tinged with pink at the base, and six or seven inches long; the secondary branches, which are inserted at acute angles, are slender, six inches long at the base of the branch, and not more than two inches in length at the apex; on these the flowers, which are all staminate and fall a day after they open, are remotely scattered, usually in one, or, occasionally, in two or three flowered clusters, and are borne on slender pedicels about an eighth of an inch long from the axils of scarious white bractlets from an eighth to a quarter of an inch in length. The flower when fully expanded is a quarter of an inch across, and slightly and pleasantly fragrant, with white boat-shaped, nearly equal, segments, which are rounded at the apex and not more than half as long as the stamens; these spread outward and are composed of flat white filaments, narrowed upward from a broad base and crowned with oblong, cordate, slightly emarginate, light yellow anthers. The ovary is reduced to a cushion-like three-lobed body covered with nectar.

*Nolina recurvata** requires the same treatment as the Agaves, and can be wintered in a dry house in which the temperature is not allowed to fall much below forty degrees, Fahrenheit. It is an excellent plant for the summer decoration of terraces and other exposed situations, as its tough leaves are not torn by wind or burnt by the sun. Like the Yuccas, Agaves and other so-called succulent plants, it will, of course, flourish in southern California in the open ground.

Plant Notes.

BOWIEA VOLUBILIS.—This interesting plant, discovered in 1866 in south Africa by J. Bowie, a botanical collector for the Royal Gardens, Kew, London, and named in his honor, belongs to the Lily family. As its specific name indicates, it is a twining plant and admirably adapted for the pillars or supports of a greenhouse, and it has a bulb not unlike a



Fig. 10.—*Nolina recurvata*.—See page 94.

San Diego County, California, often produces a taller trunk, and may, perhaps, properly be considered a tree; and in Lower California *Nolinas* grow to a still larger size with stout trunks and broad heads of foliage. All the *Nolinas*, with, perhaps, the exception of *Nolina Georgiana*, are desirable ornamental plants, especially for dry warm regions, although many of the species flourish when cultivated in pots and protected from cold in glass houses. Of

* *Nolina recurvata*, Hemsl., *Bot. Biol. Am. Cent.*, lii., 372 (1882).
Beaucarnea recurvata, Lemaire, *Ill. Hort.*, 1861, *Misc.*, 59, t.—*Gard. Chron.*, 1870, 1445, f. 254.—*Fl. des Serres*, xviii., *Misc.*, 26, f.—Baker, *Jour. Bot.*, x., 325; *Jour. Linn. Soc.*, xviii., 234.
Beaucarnea stricta, Lemaire, l. c. (1861).
Pincinetia tuberculata, Hort.

large Globe onion. It apparently does not produce leaves, but, instead, green, abortive-panicked inflorescences. The way these abortive panicles branch from the main stem is remarkable, the axils being below the branches instead of above, which gives the plant the appearance of growing upside down. The branching also is very irregular. A few inconspicuous flowers are produced at the extreme upper end of the stem; these are small, green, with white stamens; they produce seed, however, by which the plant is propagated. A specimen is now flowering in the Botanic Gardens of Smith College, and Mr. Canning writes that it does best in a light rich soil, like all bulbous plants requiring a season of absolute rest. At the first signs of growth the bulb is turned out of the pot, all the old soil shaken off. After being repotted it makes all its growth in about three weeks. It then commences to flower and lasts in flower about three months. As soon as the flowering period is over the plant begins to show signs of maturity, when water should gradually be withheld. A temperature of fifty-five suits it well.

MAGNOLIA KOBUS.—Of the Japanese Magnolias which become large trees, perhaps the best for cultivation in our north-eastern states is *M. hypoleuca*, which is still a rare tree, although it was introduced into this country more than thirty years ago by Mr. Thomas Hogg. This is one of the species whose flowers appear after the leaves are spread, and in form and habit it is somewhat akin to our native *M. tripetala*. There is no doubt, however, that *M. Kobus*, which also grows to a height of eighty feet in Japan, will in time become one of the most striking ornaments of our parks and pleasure-grounds. We have just been observing a specimen some twelve years old, and after the severe weather the smooth reddish bark of the branchlets looks fresh and healthy and every bud is plump. There is no doubt of the hardiness of the tree even in New England, and it grows with as much rapidity and vigor as any other species. It belongs to the section in which the flowers appear before the leaves, being classed in this respect with the well-known Chinese Yulan Magnolia and its various hybrids and varieties. Its blossoms are pure white and fragrant, and when fully expanded as much as five inches across. Although this species was also among Mr. Hogg's introduction, the tree is comparatively rare in American gardens, and as it does not seem to flower freely when young few persons have ever seen it in bloom. If, however, it flowers as abundantly here as it does at home when it arrives at full age it will present a magnificent spectacle in early spring. The Magnolias, both native and Asiatic, are celebrated, as a class, for their handsome flowers and large, beautiful leaves, and our climate is especially suited for their cultivation. *M. Kobus*, so far, seems as thrifty here as in its native forests. It has been developed, however, in a climate where moisture never fails, and long experience alone can prove whether its constitution can endure the strain of a series of summer droughts such as sometimes occurs in this country.

Cultural Department.

Indoor Ferneries.

WARDIAN cases may afford ideal facilities for indoor Fern-culture, nevertheless their size and expense are formidable drawbacks to many devotees of the Ferns. One authority claims to have an improvement on Mr. Ward's invention which secures better ventilation by sliding panels, but the principles are much the same in all cases—namely, an atmosphere free from soot, too much light, heat, moisture and change. Another essential is good drainage; much pleasure and profit, however, may be developed with a bell-glass and soup-plate.

Three such glasses stand in a north window of my house; a ten-inch chestnut shelf, partially supported by light iron brackets, having been inserted in place of the regular sill for this purpose. The largest shade, a ten-inch glass, rests upon the rim of a plate well on in its second century, which, apart from its æsthetic value, has the intrinsic merit of possessing a

broader rim than modern ware, thus affording desirable space between the glass and the plants within. Broken crocks and porous matter from coal-sittings fill the bowl of the plate and make excellent drainage; leaf-mold or soil taken from the native haunts of the Ferns is placed over this in the shape of a mound. I am often asked how I keep the Ferns and Mosses in place, and my reply is that hairpins are useful for many purposes, and when the house supply of these falls short deftly concealed toothpicks are passable makeshifts.

Overcrowding is to be avoided; only three varieties are growing under the glass referred to. Of these *Asplenium ebeneum* is most conspicuous because of the sentinel-like precision of its narrow fertile fronds. It is a Fern of good substance, rich color and gloss; the barren fronds are properly subordinate, spreading themselves in loose rosettes after the manner of its more dainty relative, *A. Trichomanes*. A specimen or two of the Walking-leaf, *Camptosorus rhizophyllus*, add variety in shape of frond and shade of color, relieved by gray lichens and red berries of the Wintergreen.

From a branch of a rustic twig firmly inserted in the midst of the pile there hangs a tiny basket, from which emanates a graceful plant, spreading and filling the upper part of the glass and showering pink petals on the mossy carpet below; this plant is none other than the common herb Robert, *Geranium Robertianum*.

The second glass is devoted chiefly to fine specimens of *Camptosorus rhizophyllus*, *Polypodium vulgare* and *Asplenium Trichomanes*; unsuspected prothalliums have added an *Aspidium* or two, which, with various mosses and stray wildlings, are all confined by an eight-inch glass. Here the Walking-leaf grows with the wildest luxuriance, nearly every frond rooting at its apex, but, lacking proper environment, the rootlets are held forlornly in the air, or else, as in a case recently observed, they lodge themselves in a cluster of Wintergreen leaves and skeletonize them in a short time, a parasitic performance which I have never seen recorded of any Fern.

A groove inside the scalloped edge of a glass dish just fits a six-inch bell-glass, and is the prettiest receptacle of the three. Saving a frieze of moss and a few berries, *Asplenium Trichomanes*, the English Maidenhair, has entire sway; a dainty and bewitching little plant and historically interesting, as the vaunted hair-restorer of earlier times, Parkinson, the celebrated apothecary of 1640, tells us that "it both stayeth the shedding of the hair and causeth it to grow thicke." Gerard is even more explicit: "The lye wherein it hath been sodden or laid to infuse is good to wash the heads, causing the scurf to fall off and hair to grow in places that are peld and bare."

Change of air is as necessary to plant-life as to animal-life. The shades should be removed for a few minutes every day, and to insure a constant supply of air and prevent damping off a match or two can be sometimes inserted under the glasses. A gentle shower-bath of tepid water should be given once in ten days, after which the plate may be tipped to allow surplus water to drain off; this is essential, for a water-logged condition is disastrous. In spite of extreme vigilance, with every supply of fresh moss comes an invoice of pests. Worms and snails breed with such rapidity to prey upon tender fronds and the pulp of berries that constant watchfulness must be exercised against these marauders.

The growth and longevity of Wintergreen berries under glass is remarkable. Rooted and fruited specimens, put in late in the fall, not only send up young shoots in March, but hold their fruit in good condition for months. A cluster of nine large berries which had been fourteen months under glass was destroyed by tiny mollusks—dwellers in pointed shells about a quarter of an inch long. After this I observed that a fluted specimen of brown *Thallophyte* was an excellent trap—possibly a breeding-ground—for the glistening shells were easily seen and destroyed on it. The addition of a tuft of exquisite moss brought disaster to a cluster of three perfect berries and broke their record of seventeen months. A novel spectacle was then before my eyes: the gable-end of the residence of a full-grown mollusk was protruding from the biggest berry of all, while at the foot of the plant were two more of its kind. Truly, life under glass furnishes ample food for thoughts not strictly horticultural.

Vermont.

G. A. Woolson.

Cephalotus follicularis.

WHERE a collection of cool greenhouse insectivorous plants are grown this little species can be successfully cultivated without much extra care. In European collections it is usually seen growing under bell-glasses in the full sun. Conditions such as these do not suit its requirements here when the sun gets powerful, unless continual attention be

given to airing and shading, and even then the atmosphere is apt to become too dry. The *Cephalotus* does not need a high temperature; it ought to be kept in the coolest part of the house, but it certainly delights in an atmosphere heavily laden with moisture. I prefer to grow it, especially in summer, in a roomy glass case, shaded on the sunny side with a piece of light cloth, which in dull weather can be removed altogether. In the case I put about six inches of sphagnum moss and plunge the pots in it; such plants as *Dionæa* and the *Droseras* do splendidly under similar conditions; in fact, it is about the only way in which they can be grown to perfection, so that the glass structure can be made to contain quite an interesting collection.

The *Cephalotus* must have material to grow in which is free from any decomposed matter. A good mixture consists of equal parts of fibrous Orchid peat, pulled apart into quite small pieces; live Sphagnum moss, chopped fine; coarse-grained sand and broken charcoal. Too much care cannot be used when renewing the material about the roots. The best time to perform the operation is about the end of March before the plants start into growth. It is seldom we see a plant too large for a four-inch pot. Drain the pots well, putting a large piece of broken pot over the hole and some smaller pieces over that again; pot as firmly as possible without injuring the roots, keeping the plants well above the rims of the pots; finish off with the growing points of Sphagnum, and water thoroughly. When the plants are put in smaller-sized pots than fours it is a good plan to plunge them in larger ones, using small gravel to fill the space between the pots; this not only helps to keep the roots cool in summer, but is an important aid to the drainage.

The *Cephalotus* belongs to the Saxifrage family, and is not related to any of the other well-known insectivorous plants; most of its leaves are in the form of pitchers, a trifle resembling those of the *Nepenthes*; although small, they are as handsome in appearance as any of the *Nepenthes*. The plant is a native of west Australia.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Fuchsias and Gloxinias.

OLD Fuchsia bushes which have been resting in cool quarters may now be brought into genial warmth and pruned of all dead and surplus growth. As a rule, these plants make the most effective specimens when trained as pyramids. It often happens, however, that varieties of a naturally weeping habit have so crowded the lower branches during the previous season's growth that these are much weakened and do not trim out well into shape. Such plants may be formed into standards by cutting out all the lower branches. They are equally effective in grouping. Repotting should be deferred until there are signs of root-activity and some budded growth is made. Fuchsias are gross feeders, and an abundance of well-decayed manure should be mixed with the soil used for them. The drainage must be free and water be given sparingly until the plants are in active growth. From this time onward their culture is simple. All that is required is to keep the plants in shape by taking out the tips of the strongest shoots and all flower-buds until within a week or two of the time they are required to bloom. Such plants as are not wanted for growing on will come in useful for odd corners, or for use in mixed subtropical beds. Not the least attractive feature in an amateur's garden last summer was a bed wholly composed of Fuchsias, arranged with excellent taste and trimmed with care, until it became a perfect mound of bloom. Some plants of the yellow-leaved variety, *Wave of Life*, were used as an edging.

During the early spring months cuttings of such varieties may be rooted as it is wished to retain, for old plants are not to be relied upon to winter over. These cuttings often make attractive plants during the season, shifted on into six or seven inch pots, and they are a most convenient size for hall, piazza, or table decoration. It is hardly necessary to draw attention to the many beautiful florists' varieties which are mainly hybrids between *Fuchsia triphylla*, *F. fulgens*, *F. corymbiflora*, *F. serratifolia*, *F. macrostema* and others, for, whether species or hybrids, they are all beautiful. Particular attention should be drawn, however, to some of the winter-flowering kinds, natives mostly of South America. *F. corymbiflora* is one of the most beautiful of these. It is a rambling plant when grown naturally, and best suited for a pillar, rafter, or a wall where it can get plenty of sunshine. I do not know of any American gardens where it is grown, but presume it is plentiful enough in European gardens, and could easily be obtained. One sort I know as *F. speciosa* and another as

Lord Beaconsfield, of similar character, are both good winter bloomers, with extremely long, showy red flowers. Then there are some dwarf, small-flowered kinds, almost hardy everywhere in England. It is seldom they are killed outright, however much they are cut above ground. I remember *F. Riccartorie* and *F. gracilis* among these, and believe they are varieties of *F. macrostema*, a native of Chili. *F. gracilis* makes a handsome basket plant.

Tubers of *Gloxinias* are disposed to start with little or no root moisture. Of late years we have rested ours in the pots they bloomed in, and although kept in the coolest quarters we can give them consistent with safety they have made considerable leaf-growth. It seems natural that they should start during the month of February. Enforced rest, such as is given when the tubers are taken out of the pots and stored in sand, has always appeared to me unnatural; even if all the plants live over, which is doubtful, their vitality will be lessened. Since I have kept my plants in pots I have found live roots at all times, even though there was no sign of life above ground, and active roots quickly form with the merest trace of moisture as soon as the sun gains power. Last season I grew along a batch of old tubers without repotting, and with the aid of weak liquid-manure, given when the plants were in good growing condition, they increased in size and flowered better than they did the year before. It does not seem to me that success depends as much on the nature of the soil as upon location and careful watering until root-action is well established. Situation is more important than it would appear to be, as all growers of experience will agree. Good light, but not direct sunshine, after March begins, and plenty of fresh air are essential.

Small bulbs from seeds sown last July are beginning to start, and these will grow into good specimens, coming in as a second batch. Seeds sown now will give a good percentage of seedlings for bloom during the autumn months. Seeds should be sown on pans of fine soil previously moistened, and later, as moisture is needed for germination, it should be given on the subirrigation plan—that is, from below.

Wellesley, Mass.

T. D. Hatfield.

Native Cypripediums.—Last November we secured several clumps of *Cypripedium spectabile* and *C. parviflora*. These were potted in a mixture of peat and loam and placed on a temporary shelf under one of the stages in the cool temperate house. About the middle of January they began to show signs of growth. They were then placed in a light position in the same house, where they could also get abundance of air, and kept well supplied with water. They made strong growth, and have now perfected their flowers, which are truly beautiful and greatly admired by the many visitors to these greenhouses. It is the opinion of many that the exotic species of *Cypripedium* cannot compare with these native ones for brilliancy of color and grace of form. Like many other plants, they come to far greater perfection when grown under the protection of a greenhouse than when growing in their native wilds and buffeted by wind and storm. They also last in flower considerably longer. *C. parviflorum* has also a delicate perfume. We hope to try several other native Orchids in the greenhouses another year besides *Cypripediums*, and suggest that the experiment is worth trying elsewhere.

Northampton, Mass.

Edward J. Canning.

Begonia Socotrana.—This plant, which was recently recommended in GARDEN AND FOREST for its ease of multiplication and abundant flowering from October to December, has a greater significance for the plant breeder. It is highly probable that the gulf separating the shrubby and tuberous sections of *Begonias* is to be crossed by this single drawbridge. The shrubby plants have the best leaves and the poorest flowers, while the tuberous *Begonias* have less showy leaves and flowers with great possibilities of development. We ought to have the best flowers with the best foliage and habit. The tuberous *Begonias* flower in the summer and die down yearly, while most of the shrubby forms are perennials, blossoming in the winter, when color is scarce. In *B. Socotrana* the two sections seem to meet on common ground. The bulbs produced above ground unite the plant with the tuberous section. It is a waste of time to try to cross the two sections directly; the shrubby plant should be crossed with *B. Socotrana* and *B. Socotrana* with the tuberous *Begonias*, and these two primary hybrids with each other. The intermediate character of this *Begonia*, developed on an isolated island two hundred miles from Africa, has been insisted upon by Nicholson, in his *Gardeners' Directory*, as the clue for plant breeders to work with.

Cornell University.

Wilhelm Miller.

Correspondence.

Bedding Plants at the Botanical Garden, St. Louis, Missouri.

To the Editor of GARDEN AND FOREST:

Sir,—Among the bedding plants used at the St. Louis Botanic Garden last year nothing was prettier than *Lantana Californica*; its dwarf growth, spreading habit and abundant production of soft yellow flowers in corymbs all being desirable characteristics, and as seen here it is always in bloom. To do their best the plants must be two years old. Younger ones will not flower satisfactorily.

Nothing in the garden was more charming than beds of *Plumbago Capensis*. Its lovely shade of blue is unusual in bedding plants at any season, but in late autumn, when the *Plumbago* seems to be in perfection, blues of any shade are extremely rare, and this especial shade combines most happily with the yellow of the *Lantana* mentioned, and the two can be associated in one bed advantageously by using the informal *Plumbago* in the middle, surrounded by the dwarfier and more regularly shaped *Lantana*.

A unique effect was produced by a closely filled bed of *Russelia Juncea*. Its rush-like foliage and bright scarlet Penstemon-like flowers are both pleasing and unusual. As grown out-of-doors here *Clerodendron Balfourii* was a revelation. The plants were crowded with thick masses of peculiarly attractive blossoms. In the St. Louis climate, when cut back hard, it makes a desirable bedder. The pretty, but unassuming, *Thunbergia elata* made a pleasing bed where allowed to creep over the ground and form a close mat. It is always in bloom. *Sedum carneum* was used to replace early-flowering plants, such as Pansies, which can never be depended on to flower through the season in this warm dry atmosphere as late-sown ones are expected to do in Chicago.

A large mass of single scarlet Chinese *Hibiscus* made a fine effect as seen against dark green trees and surrounded by a grass plot of at least four times its own area. Plants about five feet high were used in the middle, and each circle was set with plants of lower growth, the result being a mound of rich, glowing flowers set among their handsome, polished leaves. Tree-shaped plants of *Crape Myrtle* were surrounded by lower ones of *Phyllanthus roseus purpureus*, the foliage of the latter being in nice harmony with the flowers of the *Crape Myrtle*. Just inside the main entrance to the garden two beds of *Euphorbia splendens* flanked the way with good effect. Their gem-like blossoms and writhing, spiny stems seemed appropriately set against the gray limestone lodge at the gateway.

Among foliage plants two comparatively new ones, *Strobilanthes Dyerianus* and *Euphorbia altropurpurea*, were largely used. The first is especially commended by the authorities here for its power to endure strong sunshine without flinching or changing color, while the *Euphorbia* is liked in mixed groups. *Sanchezia nobilis* looked remarkably well, its green leaves, each about twelve inches in length and beautifully veined with deep cream color, being highly decorative. Its endurance of strong sunlight also makes it desirable in this hot, dry climate. The new *Abutilon Souvenir de Bonn*, possesses the same good qualities and retains its distinct variegation throughout the season. Two hardy foliage plants, *Artemisia stellarina* and *Salvia officinalis*, are found useful here, the latter especially holding its variegation perfectly in the hottest weather.

St. Louis, Mo.

Fanny Copley Seavey.

Lettuce under Glass.

To the Editor of GARDEN AND FOREST:

Sir,—We have recently had several days of clear, sunshiny weather, and the Lettuce crop has responded wonderfully to the change. Now that the plants have started into vigorous growth there is little trouble from rot, prices are better, and altogether the outlook is less gloomy.

One mistake every autumn heretofore has been our failure to get the soil composted early enough for the Lettuce crop. When the soil is first put into the houses it seems a little green, and the first and second crops never do as well as the third and fourth. To avoid this condition for next year we stacked our soil and manure early last fall and turned it once or twice before winter set in. It will be handled several times during next summer, and for use next fall we expect to have some soil that will be right for the first crop. Our soil is made of half well-rotted manure and half clay loam from the river bottom. We also use a little nitrate of soda as a top-dressing among the plants.

After the present crop of Lettuce comes off the houses will be planted to Cucumbers and Tomatoes. We find that cucumbers pay us far better than tomatoes, as the price of tomatoes here is not more than half that paid in other markets. At the prices paid to the State Experiment Station in Wooster, tomatoes are more profitable than cucumbers, while with us the past two years tomatoes have not paid more than one-fourth as much as cucumbers.

We plant our Cucumber seeds in pots or in sods, and when the plants are just beginning to fall over and to run they are placed in the benches about four feet apart each way. We are able to get a small crop of Lettuce from between the plants before the room is needed by the Cucumbers. As soon as they begin to blossom we have a hive of bees ready to place in each house, which saves us much time and labor in fertilizing the blossoms. The Cucumber crop from the greenhouses lasts about six weeks, and we continue cutting long after the crop comes in from the cold frames; in fact, as we do not try to grow a crop following the cucumbers we keep the houses very moist and as cool as possible, and have them bearing even up to the time cucumbers come in from the garden. The same method is practiced with Tomatoes, but the main crop is marketed during June. On account of the low prices in this market we shall only grow a few of them this year.

It is impossible to successfully grow both crops in the same house. Cucumbers need a high temperature, plenty of water and a humid atmosphere, while Tomatoes have to be watered sparingly and the air kept dry. We have learned to avoid the error of growing the two together by costly experience. We have tested the Telegraph Cucumber in a moderate way for two years and have so much confidence in it that we shall try to grow it for the midwinter market next season.

Lakewood, Ohio.

F. E. Carr.

The Mexican Plane Tree.

To the Editor of GARDEN AND FOREST:

Sir,—Referring to an article on Plane Trees in No. 415 of your journal, I beg to ask if *Platanus Mexicana* is decidedly preferable (and better in appearance) to *P. orientalis* as a street-tree; if it will grow in the United States, and where it can be obtained; also, if it has certain preferences as to soil or treatment, or peculiarities in the mode of growing?

New York.

B. H.

[*Platanus Mexicana* is more beautiful than *P. orientalis* in the silver-white coloring of the lower surface of the leaves. It is a smaller tree, however, and of less symmetrical habit. It may be expected to grow in the United States only in western Texas and southern California. So far as we know it is not cultivated except in Mexico, and probably seeds could be obtained only by employing some one to collect them from wild trees or from trees planted in such cities as Monterey or Salteo.—Ed.]

Recent Plant Portraits.

IN the February issue of *The Botanical Magazine* Sternbergia *macracantha*, which is described as the finest of all the Sternbergias, is figured. From the well-known *Sternbergia lutea* this plant differs in its larger flowers with long perianth tubes and in the fact that the leaves are produced in spring, and not with the flowers in autumn. The figure is from a plant which flowered last year in the Royal Gardens, to which it was sent by Mr. E. G. Whittall, of Smyrna, to whose zeal and activity the lovers of good bulbous plants are so much indebted.

In the same issue *Begonia umbraculifera* is first made known to science. It is the second of the genus in which hermaphrodite flowers have been noticed, and differs from all other *Begonias* in its peculiar habit with its simple, stout, erect stems, four feet in height, furnished with a few remote distichous, reniform, orbicular, peltate, fleshy leaves and bearing long-stalked supra-axillary flower-clusters, their stems concurrent at the base with the internodes above them. The flowers are white, rather small, chiefly male, and crowded into small corymbs with a few female and bisexual flowers.

The other plants figured in this issue of *The Botanical Magazine* are *Scutellaria Formosana*, an erect shrub with small blue flowers; *Hechtia argentea*, a representative of

a genus distinguished from the other genera of Bromeliaceæ by its small white subunisexual flowers, and represented by about ten species, inhabitants of Mexico and the south-western United States, and *Bifrenaria tyrianthina*, a Brazilian Orchid with rather showy purple flowers.

The Forest.

Forest Protection.*—II.

PROTECTING the forest against game is a matter which may lay claim to our interest simply as a branch of its natural history. We have not yet reached that refinement of forest management which alone makes it important. Nevertheless, the capacity of our native game for destruction is worthy of remark. Of all the game animals of this country the beaver has the greatest power for injuring the forest in proportion to its size. The writer was fortunate enough to visit the small colony of beavers on Mr. Rutherford Stuyvesant's place in New Jersey, and was amazed at the number and size of the trees cut down in a year by a single family of beavers.

Within the deer tribe in America, so far as my information goes, the moose is by far the most destructive, as, indeed, might be inferred from its size and power. "From time to time," says a recent writer in *Forest and Stream*, "we came upon places where the young trees, Moosewood and Maple saplings, had been broken down, generally at a height of seven or eight feet above the ground, and where other trees of the same variety had been stripped of their bark. . . . This was accomplished, not, as writers used to assert, by riding the trees down between the forelegs, but by means of a twist of the powerful neck of the animal. A moose, like other deer, has no upper teeth, and the barking of the trees is accomplished by a long upward sweep of the jaw."

The food of the moose consists very largely of Maples, at least five species of which, of arborescent size, occur within its usual range. It feeds also on the White Birch, on several species of *Viburnum* and Willow and on other deciduous trees and shrubs, and occasionally strips the bark from the Balsam Fir. The enormous strength of the great deer is strikingly illustrated in the following extract from a recent issue of *Shooting and Fishing*: "Turning his head, he (the moose) caught a White Birch as large as my arm between his antlers, and with as much apparent ease as you would bend a willow twig between two fingers, twisted his neck and broke it squarely over. The tree was certainly three inches through."

Among birds, grouse devour buds in great numbers, and blue jays are very destructive to seed. The wild turkey also consumes large quantities of certain seeds, often pulling up young Chestnut seedlings in their first spring to devour the nut out of which they grow. Woodpeckers, on the other hand, are said to deserve protection.

The general breadth of view already referred to as characterizing this work is pleasantly shown in the introduction to the discussion of injurious insects. The statement preliminary to the description of individual harmful species indicates the position of the insects in the animal kingdom, and gives the divisions of the class itself, with their characteristics. A section is devoted to the distribution of insects, and others to their life-history, their numbers and to the useful kinds of forest insects. The latter is especially valuable, from one point of view, since the idea so generally prevails that insects of every sort are to be classed together as injurious.

The following sentences, coupled with the general statement that conifers are far more susceptible to attack than broad-leaved trees, may serve to give a succinct view of the relation of insects and the forest.

The greatest number and the most harmful species of injurious forest insects belong to the orders Coleoptera (beetles)

and Lepidoptera (butterflies and moths). Next in importance to these come the members of the orders Hymenoptera (bees and ants) and Orthoptera (locusts and termites). The orders Diptera (flies) and Hemiptera (bugs) only include species which are moderately or slightly injurious, and the Neuroptera (lace-winged flies, etc.) include no injurious species. . . . In India and other hot countries, the family of termites, or white ants, . . . is probably more destructive to vegetable substance, though chiefly when no longer living, than any other insect family.

Among the Coleoptera, those which are of greatest interest to us are the bark beetles of the genus *Tomicus*, which are extraordinarily destructive to Spruce forests. The singular dying out of the Adirondack Spruce over large areas at the same moment, which was for a long time unexplained, has been found to be due to a bark beetle closely related to the European species here described. That we are not alone in suffering from them appears from the following extract: "Some details may be given of the latest plagues of bark beetles in the Bavarian and Bohemian forests. In the former about 24,700,000 cubic feet of wood was killed in six forest ranges. The beetles were occasionally so numerous as to obscure the sun. Accompanying *Tomicus* typographus were *T. chalcographus*, *Hylastes palliatus*, etc. In the Finisterau range 1,000 woodmen were engaged to fell and bark the trees, and, as local labor was insufficient, Bohemians and Italians were recruited for the work. In the Bohemian forest the damage done was even on a larger scale: between 1872 and 1874, on 9,012 hectares (22,530 acres), 3,632,050 cm. (127,964,000 cubic feet) of wood, or about 450 cubic feet per acre, were felled. Thus, altogether, in Bohemia and Bavaria, 152,600,000 cubic feet of wood was killed by these insects."

Another species, *Hylurgus piniperda*, while it is responsible for far less damage than the species of *Tomicus*, has interest in that it attacks Pines instead of Spruce, and among them our own *Pinus Strobus*, where it has been planted in Europe. Nothing is said of the Elm beetle, which has been proving so extremely destructive to both native and European species of Elms in the north-eastern United States. This species is not a native. Among the Lepidoptera, all species destructive on a large scale are moths. One of the most dangerous is the Pine moth, *Gastropacha Pini*, the caterpillar of which feeds upon the needles, and of whose depredations Mr. Fisher says: "In 1878, in Plietnitz, in West Prussia, forty-five millions of caterpillars were destroyed by means of tar rings, at a cost of 7s. per ten thousand caterpillars. In woods under sixty years old the hibernating caterpillars were collected at a cost of 20s. per ten thousand. The value of the annual increment of wood saved was 8s. per acre, as against 7s., the cost of the tar rings."

Another moth whose depredations are yet more dangerous is the Black Arche or Nun moth, whose attacks are chiefly confined to the Spruce. Some idea of the severity of this pest may be gathered from the fact that in East Prussia, between 1853 and 1863, trees containing 467 million cubic feet of wood were killed by the Nun moth. The damage done in the neighboring Russian province was still more serious, so that in Russia and Prussia together about six and one-half billion cubic feet of timber was killed. It is but just to add that a part of this damage was to be attributed to bark beetles, but it is probably true that they would have done little harm except for the weakened condition which followed the attack of the Nun.

The account of dangerous insects concludes with an interesting list, which names, under the head of the kind of tree attacked, the insect enemies of every part of it.

New York.

Gifford Pinchot.

Notes.

A correspondent of *The Rural New Yorker* writes that for giving young trees a strong, healthy growth in the nursery he has found no fertilizer as good as the combination of six hundred pounds of pure steamed bone and a hundred pounds of nitrate of soda applied in the spring, while later in the season

* *A Manual of Forestry*, by Dr. W. Schlich, C.I.E. Vol. IV., Forest Protection, by W. R. Fisher, B.A. London: Bradbury, Agnew & Co.

two hundred pounds of muriate of potash can be added to the acre. For the supply of phosphoric acid ground bone in some form is unexcelled.

Do not be in a hurry when the first warm days come, in March and April, to take the litter from the Strawberry beds. This blanket should not be entirely removed until the growth of the plants actually begins, although it is well to lift it up and loosen it with a fork after the snow has gone, so as to allow the ground to dry out sooner and to give the plants light and air.

At the late meeting of the American Carnation Society in this city, Mr. E. G. Hill declared that he felt assured, from experiments with different varieties, that arsenic will check the dreaded rust on Carnation plants, and in some cases eradicate it. He began by using arsenic at the rate of one pound to forty gallons of water, but, of course, since the arsenic would not dissolve this is not a satisfactory way to apply it. He finally used Fowler's Solution, at the rate of one ounce to eight gallons of water, spraying the plants with it in the usual way.

An inventor in California has perfected a machine for making fruit-cans which can be operated by a child, and which, according to the accounts, is very effective. Sheets of tin are fed into the machine at one side and sixty-four cans of any given size are turned out every minute at the other. All the joining of the seams and soldering are done by the machine, and a California dispatch says that a few of them in one factory would be able to supply all the cans used on the Pacific coast for fruit, vegetables and fish at one-tenth of the present cost.

Professor Troup, of the Indiana Experiment Station, writes in *The North American Horticulturist* that sixty-seven trees of Missouri Mammoth Quinces near Indianapolis, and ten years old from the graft, yielded last year 140 bushels of the finest selected fruit. Quinces of this variety are said to ripen ten days earlier than Orange quinces; they are much larger, of firmer texture and quite as highly flavored. Professor Troup adds that the failure of a Quince-tree to produce a good yield is more often due to neglect than to any deficiency of soil or severity of climate.

The sixtieth year of the existence of the Hamburg Gartenbau-Verein is to be celebrated in 1897 by an international exposition devoted to gardening in all its branches, and lasting from the end of April until September. There will be a spring exhibition of about five days' duration early in May, a summer exhibition lasting a week in June, and an autumn exhibition extending over ten days in September, with several exhibitions arranged for intervening periods in addition to such features as can be maintained continually throughout the season. It is to be hoped that American growers and dealers will be represented at this exposition, not only by displays of decorative plants, but by those of commercial value and interest. Roomy conservatories are promised, and an adequate list of premiums and medals will be issued. All persons interested in this project are invited to communicate with Professor Dr. E. Zacharias, Hamburg, Germany.

Since the 20th of January the weather in California has been extremely warm, and practically no rain has fallen. The rains in December were unusually heavy, but their effects have all disappeared since then in the heat and drought that has followed, so that not only the Wheat growers of the San Joaquin valley and the southern counties are threatened with serious loss, but the orchards are already suffering from lack of moisture. For twenty years past there has been no February when the temperature ranged so high and the rainfall so low. Almonds were in bloom a week ago and Apricots are in full flower, the orchards being as far advanced as they usually are in the latter part of March. If frost should come, as it sometimes does at this season, the crop of peaches and other fruits would suffer seriously, and preparations are being made on a large scale for protecting vineyards and orchards against sudden falls of temperature to the freezing point. The plan most generally recommended is to kindle slow fires and then use water in a very fine spray.

In speaking of the city-lot farms which have been made the subject of an editorial article in our present issue, Mr. Kjellgaard, the superintendent, recently stated as an interesting feature of the work last year that the most successful farmers were women. This year lots will be furnished to any woman who deserves them, so that if her husband is earning small wages she can help to support the family. One woman who was especially successful last year, when applying for a lot for next season, reported that she had still some potatoes left which she hoped to sell, and vegetables enough to carry her

through the winter. Last year when she applied for work her husband was employed on a small salary and they were very poor; now she has \$200 in the bank. It may be added that there have been many applications from the country, not only from New York, but Massachusetts and Connecticut, by landowners who want the services of these city farmers, and some of them are now arranging to accept these offers and take up farming as their occupation.

Five-pound baskets of Catawba grapes, from western New York, are still seen in the fruit-stores in fresh condition, and sell for thirty cents. There have been no hot-house grapes in the city for a week or longer, and the last importation from England commanded the extreme price of \$4.00 a pound at retail. Besides a small shipment expected during this week, the dependence for choice grapes will be mainly upon Almerias until April, when the graperies of Rhode Island will supply this luxury. The favor in which grape-fruit is held is shown by the keen competition for the limited quantities now arriving from Jamaica. On Monday of this week \$30.00 a barrel was the average price realized at a wholesale auction sale in this city. Large shaddocks sell at retail for fifty cents each, the same price asked for smaller grape-fruits, and the invoice of a Kingston steamer which landed here a few days ago included one hundred and twenty-six barrels of Forbidden Fruit. Any form of citrus fruit which can possibly be marketed as grape-fruit is being collected and shipped in this time of scarcity. The market is now clear of California oranges which were injured by frost in the last days of December, and California Navel oranges of really excellent quality are now offered at sixty cents a dozen. A good grade of Jamaica oranges, re-packed, sells for \$8.00 a barrel in wholesale lots, and the less desirable Cuban fruit, from groves neglected until the failure of the Florida supply, brings \$7.00 a barrel for selected oranges. The recent cold weather has prevented shipments of apples from the interior of the state, and less than 12,000 barrels reached this city during last week, besides about 2,000 barrels for export. The highest grade of Winesap apples, from Virginia, commands the readiest sale at high prices; these cost \$5.50 a barrel. York Imperials may be had for fifty cents less, Northern Spies, Ben Davis and Baldwins following in the scale of prices, with choice Greenings selling at \$4.00.

While most of the pineapples sold in the United States have, within recent years, come from Cuba, the cultivation of this fruit in Florida has rapidly increased, and last season 50,000 crates were shipped from sections in that state other than the Keys. The output from the central and northern part of the state this year is estimated at 35,000 crates, while, but for the damage to new plantations by freezing a year ago, a crop amounting to 250,000 crates was counted upon for the next few months. The Bahamas formerly furnished the main supply, which was carried in small sailing vessels taking four to five days to reach this port, while unfavorable winds made a voyage of twenty days not unusual. Most of the pineapples now coming from Nassau and other ports of this group are consigned to Baltimore, where they are canned. As many as 5,500,000 of these pineapples have reached that city within the past four years, and large quantities are canned on the islands. Nearly all the Cuban pineapples come to New York, 200,000 barrels and more constituting the imports for a year. These pineapples are all grown near Havana, and shipments continue throughout the entire year. The season begins, however, in the middle of March and continues at its height for four months, while the Bahama season is a month later in opening. Some of the choicest pineapples have in recent years come from the Indian River section of Florida, and exceptionally large and high-grade fruit comes from Porto Rico. The comparatively small supplies from Jamaica include some excellent varieties which are in special demand. The delay of a day in the transportation of this perishable fruit may mean a heavy loss, and twenty-four hours of warm, damp weather may injure a cargo to the extent of fifty per cent. of its original value. No vessels specially fitted for carrying pineapples are yet in service, and this tender fruit is closely packed in steamers carrying sugar and other heating articles. Quick transportation in steamers equipped with improved ventilation and the best storage facilities, as are already in regular use in the banana trade, would open up new possibilities for this department of the fruit trade. At this time when, besides the shortage caused by the loss in Florida, the trade in Cuba is affected by war, prices have been high. The grade known to wholesale merchants as Havana XX, thirty-five pineapples being required to fill a barrel, now commands \$9.00 a barrel, and this is also the importers' price to wholesale buyers for barrels holding forty-five and ninety of the fruits.

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The Plunder of the Adirondack Reservation.

UNDER a resolution of the Assembly of this state, passed on the 3d of May, 1895, a committee of five was appointed to investigate certain alleged depredations on the Adirondack state timber lands. The committee, of which Mr. Howard Payson Wilds was Chairman, and Thomas H. Wagstaff, Secretary, have just made a unanimous report, based on some fifteen hundred type-written pages of testimony, from which it appears that a great portion of the timber owned by the state has been practically without any protection during five years past, and that any one who chose to do so could cut and sell it without molestation. The sixty-five witnesses examined at different points were lumbermen, contractors, jobbers, sawmill-owners, foresters, farmers and residents of the neighborhood of the state lands, and nearly all of them testified with reluctance. The facts obtained from them, after rigid examination, relate to 125 different lots owned by the state, and embracing altogether more than 35,000 acres of land. How much timber has been cut and sold from these lands can only be estimated roughly by the summary of the testimony given in this report, but a glance at the record showing that this lot "was nearly stripped of marketable timber"; that the next one was "well lumbered over"; that "500 acres were cleaned of everything marketable," and so on, suggests a very large sum total. The reason why it is difficult to obtain testimony was stated by one of the foresters: "They are all neighbors, and they all want to trespass some if they get a chance, and, as a rule, they won't squeal on each other. If a man does, and it is known, they turn him down pretty quick." The loss, then, of an enormous amount of timber, a local public opinion which justifies the pillage of the state lands, and the inadequacy of the machinery provided by the state for protecting its forests are the three facts which stand out prominently in this report.

It is difficult to say who is the leading criminal in the chain of agents, which extends from the chopper up to the mill-owner. The owners of sawmills and pulp-mills find

in the Adirondacks a source of cheap lumber, and so long as they want wood somebody will be ready to furnish the logs either from his own private lands or from the public lands adjoining them. The mill-owners buy the logs, after they are cut, of agents who sublet contracts to jobbers, and these to gangs of choppers, so that the contract passes through many hands before it comes to the man who actually does the work. In every case where timber was cut beyond the boundary of private property, and upon the state lands, each witness would transfer the responsibility to the next man in the line, and the final trespasser almost invariably declared that if the boundaries of the state land had been better defined he would never have crossed them. As a matter of fact, in most cases no monuments mark the boundary except an occasional tree blazed many years ago. On most of the land the blazed trees are down or destroyed along most of the lines. Many of the lumbered lots have been burned over and the old marks are all obliterated. The only accessible descriptive data as to the boundaries of the state lands are those which have been furnished in the lists published by the State Forest Commission, in the local assessment rolls and in the forest map published in 1893. It may be true, therefore, that there have been cases where trespass has been committed from inability to find the state line, but one searches the testimony in vain to find that any precautions to prevent the state lands from being cut over were taken by those who let the job. No surveys are made, no boundaries are pointed out, the men are left to cut where they will, and in case of trespass the responsibility is thrown upon the jobbers, who are men of little property and willing to take chances. These depredations of timber, then, may occasionally be committed by jobbers through ignorance, and more frequently through recklessness; but they are often committed intentionally and defiantly.

Now, it is not to be believed that the lumber contractors do not know or understand the general location of the state lands, for whenever they assert some pretended right or color of title to the timber on some of these lands they can find the lines readily enough, and they at once assume the ownership of it and cut and haul it away. As a rule, this cutting and hauling has been a matter of general knowledge, and yet no one has molested contractor or jobber, and having ventured once to cut timber without trouble or expense they do so again, knowing that the settlement will be easy even if they are detected in the trespass. In general the jobbers cut where the contractors and lumbermen employ them, and they cut without investigation or concern as to whether the land belongs to the state or not. The common workmen are still more indifferent as to the ownership of the land so long as they make a living from their work. All this is done so openly that concealment is impossible—indeed, it is never attempted—and yet it is a fact that seldom, if ever, have trespassers been caught in the act of cutting or hauling timber on state lands by the forester in the discharge of his duties. This officer rarely visits the state lands during the lumbering season, and he waits till the following spring to prosecute his investigations, such as they are. Rarely, indeed, has any careful search been made by a state official to ascertain the extent of trespass, or to identify the trespasser, or to trace the disposition of the timber. The most that has been done is to report the matter to the State Forest Commission with a recommendation as to what sum should be charged for the logs in case of settlement. No prosecution has been carried on in any case for trespass, the depredators being always dealt with as innocent trespassers. At least, it does not appear that a single prosecution for the statutory penalty has ever been made in any of the frequent cases of trespass shown in this investigation, although thousands of trees have been cut for which the penalty should have been enforced. Logs have sometimes been seized and sold for what was offered, or they have been left to lie where they were found, because no one in the neighborhood of the land or of the lumberman was willing to bid against the trespasser.

Occasionally the logs are traced, but the settlement for them is made in accordance with the recommendation of the forester on the stumpage value and for a quantity agreed upon, often without regard to the facts in the case, and seldom, if in any single instance, has the adjustment for timber cut on state lands been based on a value above the market rate for like timber standing. The trespasser, then, has one chance of profit by cutting his timber without any cost. If his trespass is reported he has another chance of profit from an understatement of the quantity of timber charged as taken, and he has still another chance by settling with the state at market rate, or lower still for stumpage.

It is very plain that unless some radical change is made in the law and in public sentiment or in both there will soon be no timber left on the state lands, at least on the small and isolated parcels of such lands. It is even contended by some that the forests are so vast, the number of persons united by an interest in the cutting of timber so great, and the state police force so small that it is impossible to prevent timber thieving. It is doubtless true, as is claimed by the Forest Commission, that the state lands in the main forest, scattered like the black squares over a checker-board, and interspersed with private holdings, are hard to patrol with the small number of foresters at command, and it would be of great advantage to the state to buy up these scattered parcels within the reservation, to provide more protectors and place them where there is the greatest liability to depredation. Again, as this report insists, these foresters should be residents of the special locality assigned to their care, and they should devote their entire time to duties as forest guardians and travel over their district at least once a month. It should be their duty to follow up every clue and prosecute for recovery and punishment to the full penalty of the law, and they should be charged with the duty of enforcing all laws relating to the forest preserve. No one can doubt that these trespasses on state lands could then be materially lessened, if not altogether stopped. Property-owners and contractors would soon learn to know where their own boundaries were if they were sure of punishment when they transgressed them. That it is possible to protect the timber on state lands is evident from the fact that private owners are rarely troubled by timber thieves, because it is known that the full penalty of the law and the full value of the timber cut or taken will be exacted. A like enforcement of the rights of the state and of the penalty for every violation would operate in the same way to stop trespassers on state lands. There is a fine of \$25.00 for every tree unlawfully cut, but this extreme amount is never exacted, and this report rightly insists that, in addition to a money penalty, every one who cuts or aids in cutting or transporting state timber should be held guilty of a misdemeanor. The penal code provides for malicious injury and destruction of timber on state lands, and a person who willfully cuts down, destroys or injures any timber standing or lying on lands of the people of the state is punishable by imprisonment and fine, or both. But this does not reach depredations on timber within the forest reserve, nor does it prevent the violation of the constitutional prohibition for the sale and removal of timber on the reserve. It is, therefore, recommended that depredations on the forest reserve—that is, the felling and removal, or the causing to be felled or removed, of any timber on the state lands, or of receiving with knowledge timber taken from the state land without the authority of law—be made a misdemeanor in addition to the fine.

Beyond question, it should be made a criminal offense to steal timber from the state, but without a compelling public opinion behind it such an act would never be enforced. What is needed more than law is an aroused public conscience. A man is treated like a thief by his neighbors if he steals their timber, but so long as they consider him an innocent trespasser at the worst if he chances to be detected in appropriating the timber of the state, the public forests will be a public prey.

Notes of Mexican Travel.—XI.

CUERNAVACA.

MY eleventh Mexican journey was limited to the last three months of 1895. I found the rainy season drawing to a close when I reached my field at the end of September. Everywhere over south Mexico evidence of abundant rains was given by a better-developed vegetation than I had ever before seen. Not a few scarce plants which had hitherto eluded my endeavor to secure specimens in sufficient number for my large distribution, now easily yielded me ample material. In quest of these I tramped once more several familiar fields. I saw the delightful Jalisco region smiling with plenty, as always; its people happy and enterprising. Greatly increased traffic over the railroad attested their awakening activity—their really getting into line with the world's progress. A better illustration could scarcely be found of the civilizing and developing power of the railroad, and the Mexican Central, encouraged by such results, is advancing its line farther into this fertile state.

Again I visited for a few weeks the remote state of Oaxaca, traveling the dry and heated cañons of the lowland district of Cuicatlan as well as the elevated and heavily forested mountains to the north of its capital. My delightful occupation during the sunny days of the tropic autumn was the gathering of new or rare species located the previous year, as well as those which now surprised me by a seeming first appearance. Of nearly everything there was in this season a profusion. A chief object in climbing again the Sierra de San Felipe above the city of Oaxaca was to secure a full complement of specimens of *Pinus Teocote*, found there by Liebmann fifty years ago. The species occupies, almost to the exclusion of other trees, certain ridges on the flanks of the mountain at an elevation of about 9,000 feet over sea-level, the soil of which is a reddish clay—dry, hard and poor. In such conditions it is a slender tree of inferior, or, at best, but medium size, with hard and resinous wood of reddish color. *P. Montezumæ*, at the same elevation and below, mingles with the Oaks in more fertile and moister soil, while above, and especially on the summit ridges, it sometimes forms solid forests, the best-developed individuals of which (those standing in summit valleys) are three to four feet in diameter.

Several weeks of my brief season, while the course of vegetation was at its best, but swiftly passing, were devoted to work in a charming field which was to me a fresh one. Such was the country surrounding the city of Cuernavaca, which lies beyond the mountain-wall that forms the southern rim of the Valley of Mexico. Colonel Hanyson, who, with irresistible energy, is opening waterways and steelways over the Mexican Republic, had carried his Mexico, Cuernavaca & Pacific Railroad almost to Cuernavaca, some forty miles south from the metropolis, making the dreaded diligence ride over frightful lava-beds and over mountain heights a thing of the past. Finding now so easy of access a region whose praises had long been sung to me, the temptation to reconnoitre its vegetation, before traveling far away, was not to be resisted. The ride by train revealed magnificent scenery—the grandest seen in Mexico; and from my three days' trip I returned with so large a load of plants that I moved over to Cuernavaca and settled down to work there. Other regions might wait.

The Cuernavaca train, issuing northward from the Buena Vista Station, in Mexico City, first swings around to the west over salt meadows, then turns southward just back of the heights of Chapultepec, crowned with national buildings, to pass over Scott's battle-field of Molino del Rey, through Tacubaya and other suburban towns, most interesting with their magnificent villas, surrounded by parks and gardens, and over dry glades bristling with plantations of Maguey. About ten miles out the foot of the Sierra de Ajusco is reached. Here, after passing through a scattered forest of *Pinus leiophylla*, a symmetrical tree of medium size, with the slenderest leaves and densest among

Pines, we are confronted by lava-beds covering the mountain-side and spreading for miles over the valley at its foot, a wild waste, almost impassable even on foot, black, brown or red rock, but half-concealed by vegetation. Down the slope innumerable streams of molten lava once poured, crowding upon and overrunning each other, heaping up ridges and hillocks or plowing out channels, seething and swirling, and, as they cooled, cracking into chasms, or, by upheavals of crust, forming frequent little grottoes. Right over this pedregal, through devious loops and up toilsome grades, our train mounts to the summit of the Sierra. To scan the scenes through which we pass yields intense interest. This pedregal is seen to be a preserve of plants from far and near. For beauty, it is like a flower garden. From nooks and crannies of the rough rocks, or from open patches amid masses of lava, spring Dahlias and Begonias, Senecios and Stevias, Pentstemons and Salvias, flowering shrubs and flowering trees—blooms in every color to make the scene bright and pleasing. On driest crags stand great Cotyledons and Sedums, and in the partial shade of little grots rugged walls are softened by delicate Ferns. Thus, on a gigantic scale, nature has here wrought at wild gardening with surpassing results. One catches glimpses of a thousand pieces of rock work which the gardener would covet and long to transport to his city parks. Higher up the scene changes for a brief space to one of extreme desolation, where fragments of lichenized rock strew the slope. Then, as we near the summit over such open slopes, our eyes turn to survey the Valley of Mexico, that wonderful valley, in the praise of whose beauty and grandeur the Spaniard exhausted the riches of his language. No better point of observation could be chosen. We are some 2,000 feet higher than the level of the valley, and are here sitting at our ease in a railway train. Nothing obstructs our view of the entire valley some fifty miles in breadth. We look down upon the great city in its midst, with its two hundred towers and domes; see the causeways, marked by bordering lines of Willows and Australian Gum-trees, which radiate from it across green meadows; count scores of villages nestling amid greenery and shade, and trace the shining lakes, white-rimmed by bare alkaline flats. We follow the complete circle of mountains which embrace this valley. Over against us in the south-east, and seemingly face to face with us at this height, dominating all the circle, stand the two great snowy mountains which are the crown of all the scene.

Crashing through rock-cuts on the verge of the summit we are swiftly borne into a thin forest of *Pinus Montezumæ*, with scattered lines of *Cupressus Benthami* along watercourses, then out over open grass lands, broken by fields of Wheat, Barley and Potatoes, and on among abrupt knobs of volcanic rock, with *Juniperus tetragona* finding congenial conditions in their scanty soil. A mile or two away on our right the bare peak of Ajusco rises some 3,000 feet above us; and nearer on our left are several prominent summits of rounded outline. Below us and near we mark a minor crater like those strewn eastward over the valley, a depressed cone of regular form and showing a sunken top. After a dozen miles of this mountain plateau, called the Serrano de Ajusco, we enter near its southern border a heavier forest of *Pinus Montezumæ*. This forest extends far down the southern slope of the mountain, but other species of trees gradually take the place of the Pine.

Cuernavaca is situated at the foot of the southern slope of Ajusco, where the cold storms which sweep the Gulf coast in winter can hardly gain access; hence it enjoys the perfection of a winter climate. Fields of tender vegetables, like tomatoes and squashes, planted in November for fruiting in winter, attest the absence of frost. Its summer climate is also agreeable, for its elevation of 5,000 feet above sea-level precludes oppressive heat. Moreover, the rain is said to fall here mostly by night. From this point one has a nearer view than from the City of Mexico of the

great snowy summits rising above forested slopes; and here the interest of the view is greatly enhanced by the striking contrast afforded by an intermediate range of bare red rock, disordered masses, serrated, castellated and pinnacled beyond description. Above and about the town the mountain side is furrowed by many ravines so deep as to receive the name of barrancas. Below the town these open out into a wide valley which is green throughout the year with plantations of cane. Streams of pure water course down through every street, and fountains are frequent. To this charming spot Cortez came to build his palace and enjoy the fruits of his conquest; to this quaint and quiet town, verdant and shady under bright, warm skies, was attracted the ill-fated Maximilian to make himself a secluded home, and hither he was wont to ride by night to hide from assassins in the thick wood of his high-walled garden.

The several barrancas of this neighborhood, with their brooks and waterfalls, their thickets of shrubs, their cliffs and bluffs, shaded or exposed, dry or wet, and the swampy meadows at their bottom offered me a field for botanizing which I have not seen excelled. The mountain woods more distant were hardly less inviting. The character of its plants indicates that this region belongs to the same floral zone as Oaxaca and Guadalajara, and I detected here twenty-five or more species which have been late discoveries in those fields. This fact may indicate that the botanists, Bourgeau and Bilimek, who followed Maximilian here, shared their master's fear, for these plants were growing within easy distance from the city; but, better than that, this district was still treasuring its own quota of undescribed plants to reward my eager search. The most conspicuous among the new plants found about Cuernavaca is *Lippia iodantha*, Rob. and Greenm. (see fig. on page 105), a shrub five to ten feet in height. Its small, yellow flowers are borne in purple bracted heads nearly an inch in diameter, and these profusely cover the branches of the plant, making it a lovely object through many weeks of the autumn.

Charlotte, Vt.

C. G. Pringle.

Notes on the Names of Yuccas.

FOR many years after their discovery by the botanists of the commission which established the boundary between the United States and Mexico, at the close of the Mexican war, misapprehension as to the specific rank and distribution of the baccate-fruited Yuccas of our southern territory existed, all the early collections being extremely meagre and unsatisfactory.

The first species of this group which was described is *Yucca baccata* (Torrey, *Bot. Mex. Bound. Surv.* [1859]). It is a plant with a short subterranean stem, or with a stem lying prostrate on the surface of the ground, glaucous concave leaves much roughened on the back, flowers often more than four inches in length—that is considerably longer than those of any other *Yucca* now known, and succulent black fruits furnished at the apex with short beaks. *Yucca baccata* inhabits arid plains and valleys in southern Colorado and Utah, and northern New Mexico and Arizona, and apparently never forms an upright stem or descends from the high Colorado plateau into the southern deserts. It was first collected by Dr. J. M. Bigelow in New Mexico, and the earliest mention of it is on page 147 of the fourth volume of the Pacific Railroad Reports. When Torrey described his *Yucca baccata* a few years later in the Mexican Boundary Report, he referred to it a *Yucca* which had been collected by Thurber, near Parras, in Cohahuila, and suggested the varietal name of *Macrocarpa* for a large arborescent *Yucca* which Dr. Bigelow had found on the plains of western Texas, alluding at the same time to a *Yucca* which Dr. Parry had gathered near Monterey, in California.

Dr. Engelmann, in his studies of *Yucca*, published in 1873 in the third volume of the *Transactions of the St. Louis Academy*, in which the characters of the genus and its natural sections are established, considered the Parras plant

of Thurber and the western Texas plant of Bigelow identical, and southern or arborescent forms of the stemless *Yucca baccata* (*Yucca baccata*, β *australis*) connected with that species by Parry's California plant.

In the spring of 1887 I was in *Nuovo Leon* and was able to establish the fact that the flower panicles of the large arborescent *Yucca* of that part of Mexico are pendulous (GARDEN AND FOREST, i., 78, fig. 13-14), a character peculiar, so far as is now known, to this tree; and that it had been described in 1873 from young plants in European gardens as *Yucca filifera*. It is this species, as shown by Thurber's specimen (No. 1857) in the herbarium of Columbia College, which appears in a picture on page 490 of the second volume of the Personal Narrative of the American Boundary Commission, where a wide-branched tree bears numerous erect panicles of flowers which display the zeal rather than the accuracy of the artist.

These erect panicles of the artist's imagination caused some confusion in Professor Trelease's paper on *Yucca* in the *Fourth Report of the Missouri Botanical Garden*, in which he recognizes the fact that the *Yucca* of the plains of western Texas is a distinct species for which he proposed the name of *Yucca australis*, joining with it, however, Thurber's *Parras* tree, which he recognized as distinct from *Yucca filifera*, the name proposed in an earlier paper for the *Nuovo Leon*, *Parras* and western Texas plants.

This arborescent *Yucca* of western Texas, which is the largest *Yucca* of the United States, is quite distinct from the stemless *Yucca baccata*, not only in habit and size, but in the color, shape and smoothness of the leaves and the character of their fibrous margins, the long pendulous branches of the panicles of flowers, which were well shown in the illustration in our last volume (p. 415); in the size and shape of the flowers and the size of the fruit. This plant having been first described as *Yucca baccata*, var. *macrocarpa*, should when raised to a species bear the name of *Yucca macrocarpa*, which I now propose for it.*

The confusion with the name *Yucca macrocarpa* is increased by the fact that in 1881 Engelmann gave it to an arborescent *Yucca* of the mountains of southern Arizona, which in 1873 he had described as *Yucca Schottii*, under the impression that the two plants were distinct, a view which the abundant material collected during the last few years shows to have been erroneous.

The synonymy of *Yuccas* has been further complicated by the use of the specific name, *macrocarpa*, for the *Yucca* found by Parry near Monterey, California, and always considered identical with Torrey's *Yucca baccata* until the naturalists of the United States Department of Agriculture connected with the Death Valley Expedition showed it to be distinct, and called it *Yucca macrocarpa* in the belief that it might be the same plant as Torrey's *Yucca baccata*, var. *macrocarpa*, of western Texas.

The habit of this southern California *Yucca*, the color, surface and margins of its leaves, and the size of its flowers abundantly distinguish it from the stemless *Yucca baccata* of Torrey and from *Yucca macrocarpa* of Texas. It is without a name, and I propose to call it *Yucca Mohavensis*,† as it is most abundant and grows to its largest size on the Mohave Desert, this, too, being the name which Dr. Coville, the botanist of the Death Valley Expedition, gave it in his manuscript notes of the expedition. C. S. S.

Foreign Correspondence.

London Letter.

DENDROBIUM SARMENTOSUM.—This is a new species allied to *Dendrobium barbatulum* and lately named by Mr. Rolfe from specimens now flowering at Kew and which were received from Burma. It forms an erect cluster of crowded proliferous, slender pseudo-bulbs, eighteen inches high, with deciduous leaves and axillary flowers, usually in pairs and developed freely by the last matured growth. The flowers are only about an inch across, white, with a yellow stain on the front of the labellum, and a few thin lines of red on the side lobes. A well-flowered specimen is attractive as a flowering plant, but its chief charm is in its powerful violet-like odor. Messrs. Low & Co., of Clapton, also lately imported this species from Burma, and they exhibited it in flower last week under the name of *D. fragrans*. This, *D. aureum*, *D. luteolum* and *D. Kingianum* are worth a place in every collection of tropical Orchids on account of the sweet perfume of their flowers. They all flower in winter, examples of them being in flower now at Kew.

DENDROBIUM CURTISII, a hybrid between *D. aureum* and *D. Cassiope*, raised by Messrs. F. Sander & Co., resembles *D. endocharis*, but promises to be stronger and more floriferous. Its pseudo-bulbs are from six to twelve inches long and bear numerous flowers two inches in diameter, white, with a dull crimson blotch on the base of the lip.

DENDROBIUM PALLENS, a new hybrid between *D. Findlay-anum* and *D. Ainsworthii*, raised in the garden of Sir Trevor Lawrence, is a beautiful addition to the numerous hybrid *Dendrobes* now in cultivation. Its flowers are large, white, faintly tinted with rose, the long cordate lip having a blotch of pale yellow in front. It is very free and appears to be a vigorous grower. A certificate was awarded to it.

DENDROBIUM BURFORDIENSE, a hybrid between *D. aureum* and *D. Linawianum*, raised in 1892 by Sir Trevor Lawrence, was exhibited splendidly in flower by him last week. It has flowers as large as a good variety of *D. nobile* and colored pale rosy mauve tinged with yellow, the odor being equal to that of *D. aureum*. This is another hybrid that deserves to rank with the best of garden Orchids.

ODONTOGLOSSUM RETUSUM.—One of the most interesting of the many rare Orchids shown at the meeting of the Royal Horticultural Society held last week was a plant of this *Odontoglossum* from the collection of Mr. Woodall, Scarborough, who has had the plant many years and finds it is happiest when grown quite cool. Sir Trevor Lawrence possesses a plant of it, and these two are the only examples known. It has the pseudo-bulbs and habit of a *Cochlioda*, to which it is evidently closely allied, but it differs from the several garden representatives of that genus in the stoutness, length, branching and number of flowers upon its scape. This in Mr. Woodall's plant was twisted several times around stakes, and it bore at least one hundred flowers as large as those of *Cochlioda Noëtzliana*, their color being rich orange shaded with crimson. *O. retusum* was described by Lindley from a specimen collected by Hartweg on the mountains of Saraguro, Peru.

HOULETTIA TIGRINA.—A plant in flower of this rare species was shown last week by the Hon. Walter Rothschild. It was first described about forty years ago by Lindley from specimens imported and flowered by Monsieur Linden, whose collector, Schlim, found it in Ocaná, Colombia, at an elevation of 4,800 feet. I have never seen it in flower before. The plant shown had broad, plaited, erect leaves nearly two feet long and bore two short erect scapes, one with two, the other with four flowers, each of which was four inches in diameter, the sepals ovate, concave, straw-colored, with dull rose spots and reticulations, the petals smaller, acute, with a lobe on each side and colored like the sepals, and the singularly formed, fleshy two-horned lip white, spotted with crimson. Although not so attractive as *Houlletia Brocklehurstiana*, it is as good a garden Orchid as the other half-dozen species of *Houlletia* known,

* The synonymy of this plant would be then:

Yucca macrocarpa.
Yucca baccata, var. *macrocarpa*, Torrey, *Bot. Mex. Bound. Surv.*, 222 (1858).
Yucca baccata, β *australis*, Engelmann, *Trans. St. Louis Acad.*, iii., 44 (in part) (1873).
Yucca baccata, Sargent, *Forest Trees North Am. 10th Census U. S.*, ix., 219 (in part) (1874).
Yucca filifera, Trelease, *Rep. Missouri Bot. Gard.*, iii., 162 (in part) (not Chabaud) (1893).
Yucca australis, Trelease, *l. c.*, iv., 190 (in part) (1893).

† *Yucca Mohavensis*.
Yucca filamentosa,? Wood, *Proc. Phil. Acad.*, 1868, 167 (not Linnaeus).
Yucca baccata, Engelmann, *l. c.* (in part) (not Torrey) (1873). Trelease, *Rep. Missouri Bot. Gard.*, iv., 185.
Yucca macrocarpa, Merriam, *North American Fauna*, No. 7, 358, t. 14 (*Death Valley Exped.*, ii.) (not *Yucca baccata*, var. *macrocarpa*, Torrey, nor *Yucca macrocarpa*, Engelmann) (1893).

but like their allies, the Stanhopes, they do not find general favor, notwithstanding the large size, rich colors and aromatic odor of the flowers of most of them.

LÆLIA EYERMANIANA.—An importation of this beautiful *Lælia* was sold recently by auction under the name of *L. Marriottiana*. It was first flowered by Messrs. Sander & Co. in 1888, when Reichenbach gave it the former name and suggested that it was a natural hybrid between *L.*

pale rose-purple, with tinges of a darker color on the segments, which are blunter than in typical *L. furfuracea*.

MASDEVALLIA SHUTTRYANA.—Sir Trevor Lawrence raised this hybrid in 1892 from *Masdevallia Shuttleworthii* and *M. Hareyana*. It has also been raised by Mr. Chamberlain, where it has lately flowered, and as the flowers of the latter plant are larger and of a brighter color the varietal name of *Chamberlainiana* was accepted for it by the Royal Horti-



Fig. 11.—*Lippia iodantha*, n. sp. Rob. & Greenm. ined.—See page 102.

majalis and *L. autumnalis*. Two years ago a number of plants of it were sold by auction for *L. majalis*. Some of these were obtained for Kew, where they flowered freely, as many as eight flowers being borne by some of the scapes. They have flowered again this year. There is not much to distinguish this from *L. furfuracea*, except its free habit and many-flowered scape. Mr. Rolfe thinks it is a natural hybrid between *L. majalis* and *L. albida*. The flowers are as large as those of *L. autumnalis* and colored

cultural Society. It is a remarkable hybrid, having short oblanceolate leaves, single-flowered scapes eight inches high and large flowers, somewhat like those of *M. Shuttleworthii* in shape, colored rich rosy mauve, tinged with red, the tails bright orange. Hybrids such as this are worthy additions to garden Orchids. The name is an attempt to hybridize the names of the parents.

MASDEVALLIA HENRIETTA, raised in the garden of Mr. F. L. Ames, Massachusetts, in 1893, from *M. Shuttleworthii* and

M. ignea, was exhibited in flower last week by Sir Trevor Lawrence, and was awarded a certificate. It bears some resemblance to the last-named hybrid, differing mainly in the color of the flowers, which are yellow, tinged with rose and red-brown.

PLEUROTHALLIS ROEZLII.—This, which is one of the most remarkable of the three or four hundred species of *Pleurothallis* known, is represented in the collection of Sir Trevor Lawrence by a very large healthy specimen which was exhibited last week bearing six flower-scapes springing from a cluster of healthy green leaves, the blades measuring a foot in length and the petioles six inches. Each scape was a foot long, nodding, and bore about a dozen partially opened, inflated, crinkled flowers nearly two inches long and an inch across and colored deep claret-purple, the color of *Veratrum nigrum*. English cultivators were first made acquainted with this plant in 1885, when it was shown in flower in London by Monsieur Godefroy-Lebeuf, of Paris. There is a plant of it in the Kew collection which was raised from a leaf of Monsieur Godefroy-Lebeuf's plant, *Pleurothallis* being readily multiplied in this way. According to Veitch, *P. Roezlii* was first described in 1862 under the name of *P. laurifolia*, a name which is descriptive of the sturdy healthy green leaves of the plant. It is a native of Colombia.

CYPRIPEDIUM NIGRITUM.—Collectors of *Cypripediums* may like to know that Messrs. Low & Co. have plants of this practically unknown species. It was first described in 1882 by Reichenbach from specimens supplied by Messrs. Wallace, of Colchester, who had imported it from Borneo. It has the leaves and habit of *C. virens* and the flowers of *C. barbatum*, but smaller, darker, with narrower, paler petals and smaller, more numerous marginal warts. The dorsal sepal is only an inch long. Reichenbach said it was near *C. barbatum*, but quite distinct. Plants of it have recently flowered in the Clapton nursery, and have been determined by Mr. Rolfe.

SELENIPEDIUM SARGENTIANUM has an exceptionally tall scape, a plant of it now in flower at Kew having a scape two and a half feet high. The flowers are developed singly on the upper portion, and they are about three inches across, yellowish green, with red margins to the segments. It is not likely to become a general favorite.

London.

W. Watson.

Cultural Department.

The Essentials of a Good Lawn.

THIS is the season when we are often asked how to establish a good lawn and insure its permanence. Downing names three essential requisites: (1) Deep soil; (2) proper kinds of grass, and (3) frequent mowing. For this climate I would add a fourth—that is, plenty of water. The air of an average American summer is not so well adapted to the production of a fine lawn as is the humid atmosphere of Great Britain. There, not so much attention need be given to the richness of the soil, as the moisture takes its place in a measure. But in this country the soil should be deep and rich, with a subsoil capable of retaining moisture, but not in excess. If the subsoil is hard and tenacious it should be well underdrained and trenched, or subsoiled to a depth of sixteen or eighteen inches, so as to create a reservoir for holding moisture which may be drawn upon by the plants as needed during dry times. This matter of subsoiling does not receive the attention it deserves in our climate. Many persons seem to think that if the surface soil is in good condition nothing further is needed. Such persons should bear in mind that it is a deep soil only which will furnish moisture for grass roots through continued drought, so that the lawn will remain green during the entire summer and autumn.

Again, too much attention cannot be given to the preparation of the soil before the seed is sown. It should be plowed and reseeded, cultivated, harrowed and rolled until the whole is thoroughly pulverized and mixed to a depth of ten inches. This work should be done in the fall, and then the plot should be left to settle all winter before the seed is sown. The foundation will then be firm. This not only makes a compact bed which the tender grass roots need, but it will insure the lawn

against those little knolls and hollows which are so objectionable in appearance and do so much to obstruct the use of the mower.

Only two kinds of Grass are really worthy of consideration for this climate. These are Kentucky Blue Grass, *Poa pratensis*, and Red Top, *Agrostis vulgaris*. There are a few others, such as Rhode Island Bent Grass, a finer kind of *Agrostis*, which may be sown, but it is more expensive and little superior to a good strain of Red Top. A little Sweet Vernal Grass, or White Clover, may be added, but neither is essential. The coarser Grasses, such as Timothy, Orchard Grass or Meadow Fescul, should never be sown in a lawn. They are short-lived and too coarse and stiff to make a soft, velvety carpet. There are many lawn mixtures advertised and sold at high prices; some of them are good and will make excellent lawns; but, if analyzed, the best of them will be found to consist mainly of Blue Grass and Red Top, which may be bought in the market for from \$1.50 to \$2.50 a bushel.

To seed properly, from two to three bushels will be required to the acre, owing in some measure to the amount of chaff mixed with the seed. This should be sown as early in the spring as possible, so that the young plants may become well established before the hot dry weather of midsummer. The sowing of oats with the seed has been recommended as a protection to the young Grass-plants, but I have never yet found that a strong, gross-feeding plant like the Oat would furnish protection to a delicate, slow-growing one. On the contrary, the so-called protector will rob the weaker plant of its nourishment. Red Top germinates much more quickly than Blue Grass, and will furnish all the protection necessary, besides covering the surface with a green coat almost as quickly as Oats will. After the Blue Grass gets its roots well established in deep rich soil it will need no further protection, but will assume entire control in a very short time.

The third essential is early and frequent mowing. If the grass is allowed to get too large before being cut, the stubble will be too stiff, and we lose that soft velvety character which is only produced by frequent mowing. It is time to begin as soon as the grass is tall enough for the mower to catch it. A few annual weeds which may make their appearance during the summer will do no harm, as they will be kept down by the mower and not allowed to ripen their seeds; but such perennials as the Docks, Dandelion, Plantains and their kind should be dug up as soon as they can be seen, and water must be in constant supply to feed the grass, keep it green and growing. The deep-soil preparation will help to do this, but he is fortunate who can draw on some reservoir for occasional irrigation. Where water is always abundant less care need be given to fertilization, otherwise it will be well to top-dress the lawn early every spring with thirty or forty bushels of unleached ashes and three or four hundred pounds of bone-meal or superphosphate to the acre. This will keep the grass in thriving condition. Barn manure is too unsightly, and should not be used except in localities where snow covers the ground all winter, and then it should be raked off as early as possible in the spring. By following out the suggestions given here in providing the four essentials, we may have as fine lawns in this country as they do in England; lawns which will last a lifetime and be a continual source of pleasure to all who see them.

La Fayette, Ind.

J. Troop.

Orchid Notes.

DENDROBIUM THYRSIFLORUM is usually an easy plant to manage, and yet we often hear of its failure to bloom. While it is growing it should be helped as much as possible to make a strong, unchecked growth until December, when it should begin to rest. In January and February the plants should be dried until the pseudo-bulbs show signs of shrinking, and then water should be given. If this is kept up the bulbs ought to be one or two inches long by the middle of February. If dried too completely the buds blast, if kept too moist new growths are encouraged at the expense of flowers. *Dendrobium Hookerianum* and *D. Dalhousianum*, in order to be flowered successfully, need more severe drying. If treated as evergreens they flower sparingly. Indeed, I have known specimens of *D. Dalhousianum* to be five feet high that have not bloomed for years. With a good root-system and large, healthy pseudo-bulbs a little shriveling does not hurt them in the least.

Vandas which have flowered well have a tendency to give a second crop and should have the stems nipped out. Second flowering will debilitate the plants, and the lower leaves will be lost and those which remain will turn pale. Vandas, *Angreecums*, *Aerides* and *Phalænopses* should not be dried as

severely as *Dendrobiums*, *Lælias*, *Cattleyas* and the like, which have a reserve in their pseudo-bulbs to prevent any sudden dangers from a longer drought than is necessary.

Potting should now be attended to, and *Lælias*, in particular, need working over wherever the peat is sour or sodden. If the plant has settled too low or has overgrown its receptacle it should be repotted. Some will only need a little new fibre tucked under them here and there. *L. autumnalis* and its varieties which have shown a good start in the roots need immediate attention. After covering the bottom of a basket with potsherds a thick layer of peat fibre should be added with the fibrous material loosely shaken out. After trimming old shoots close up to the stem and cutting out any diseased or bruised pseudo-bulbs, basket them with more peat. If proper-sized pieces of fibre are used and skillfully worked in, little or no wire will be needed. When finished the plants should be entirely inside the margin of the basket and raised above the edge. A little live sphagnum can be used on the top layer when basketed. By all means have the plant firm, the stems not buried, and in a position that allows the developing break to push on unobstructed. When finished, hang up and do not water for three or four days, to avoid any danger of starting decay at the roots. In a week or two baskets may be top-dressed with live sphagnum and watering can be increased. An intermediate house suits these plants and they need abundant light and air, although, of course, they never should be subjected to a draft. If *Vanda Catharti* has made a good growth and appears healthy, but refuses to flower, bend the stem to an oblique position, and this will sometimes have the desired effect. A light form of *Cattleya Schroederæ*, with a beautifully marked and wide throat of orange, is now very handsome. The good forms of any recently imported plants can now be gone over and selected. Albinos usually have the outside of the base of the leaf of the same color as the remainder, while the usual forms are mottled with pink or red at the point of attachment. Albinos should be tried a second year before they can be considered lasting. They often assume a pinkish tinge after the first year.

Missouri Botanic Garden.

Emil Misch.

Begonia Socotrana.

IT is difficult to understand the force of Mr. Miller's remark on page 97 that the effort to cross *Begonia Socotrana* directly with the fibrous-rooted section would be a waste of time. In *B. Gloire de Sceaux* (*Socotrana* × *metallica*) we have had for a decade a very beautiful hybrid which is valued wherever it is known. *B. Bijou* (*Socotrana* × *insignis*) is also a distinct and pleasing hybrid, perhaps not so well known. Monsieur Lemoine's hybrids *Triomphe de Lemoine* and *Triomphe de Nancy*, crosses between *B. Socotrana* and perhaps *B. Roezlii*, are interesting plants with succulent stems and rather stiff habit, having very numerous persistent flowers. These plants offer much encouragement to hybridizers, and it is singular that they have not been followed by crosses with other herbaceous kinds which would be more likely to prove valuable than crosses between tuberous kinds to ordinary cultivators. *B. Socotrana* was quickly taken in hand after its first flowering in 1881, and though a number of hybrids have been offered by Veitch and Lemoine they do not seem to have become at all common in cultivation. Veitch's productions—*John Heal*, *Adonis* and *Winter Gem*—are not rapidly propagated, and I found *Adonis*, the one tried here, an obstinate plant. The Lemoine hybrid, *Gloire de Loraine* (*Socotrana* × *Dreglii*), has wonderful racemes of flowers which persist for many weeks, but the plant is of a rather stubborn character, and it can scarcely be classed among varieties likely to become popular. In fact, it is not clear that tuberous hybrids are desirable unless they prove to be readily reproduced from seed. Tuberous *Begonias* are short-lived, and, with the exception of *B. Marliani*, they require frequent propagation from seed or cuttings. In view of such crosses as have been made it would appear that the infusion of the blood of *B. Socotrana* militates against the latter mode of propagation.

Begonia Socotrana is very interesting botanically and horticulturally. It is distinct, but scarcely as beautiful as many of its interesting relatives, for, among the numerous species and hybrids of *Begonias* are a great many which, if well grown, are most charming plants both in foliage and flower. They are easily cared for, but, as a rule, the plants have one serious fault. If one may use the expression, their articulations are very unstable, and a sudden falling of temperature, a little gas or carelessness in watering will cause them to shed their leaves and flowers with great promptness. The small-flowered kinds are as handsome as those with large flowers, and we do not need

any addition to the size, an illusion or delusion which too often misleads the hybridizer. But if we could have a few additions to the herbaceous kinds possessing some of the stability of *B. Socotrana*, with little or none of its resting or deciduous habit, they would be great gains and be appreciated by all lovers of greenhouse plants.

Elizabeth, N. J.

J. N. Gerard.

Seasonable Greenhouse Notes.

WITH lengthening days and increasing sunlight greater watchfulness in such matters as temperature, ventilation and watering is necessary. All possible potting should be completed before the spring rush commences, and nothing left undone which may as well be done now as later in the season when other work is pressing.

The propagation of bedding-plants will now require attention. *Coleus* quickly roots in a bottom-heat of seventy-five to eighty degrees. If a few old plants have been kept for stock and judiciously pinched in a moderately warm house plenty of cuttings may be procured. The tips taken from these young plants late in the season may be inserted. The old plants are liable to attacks of mealy-bug and should be consigned to the rubbish heap. *Alternanthera* delights in a warm moist atmosphere, and nothing equals a good hot-bed for these conditions. We cut our old plants well back, and these give a plentiful supply of cuttings in a week or two. If there is likely to be any shortage of *Zonale Pelargoniums*, cuttings inserted now will make good plants by bedding-out time. We find the middle of March early enough to start a lot of *Madame Salleria Geraniums*; this variety still remains unequaled for borders. *Fuchsias*, *Lantanas*, *Heliotropes*, *Stevias* and many other plants require propagating now, and the cutting-bench should be fully occupied. *Geraniums* which have been carried over winter in boxes of sand with only sufficient water to prevent shriveling have recently been placed in two-inch pots in a warm house. These are shifted about April 1st to four-inch pots in which they make neat little plants.

Cannas are among the most useful of summer bloomers; this is a good time to start the main supply. We cut the roots up, leaving an eye to each piece and pot in small pots, in light sandy loam. A temperature of not less than sixty degrees should be afforded them, and if bottom-heat can be used it is all the better. A shift into five-inch pots when the smaller pots are well-filled with roots will make good plants by the middle of May. Tuberous *Begonias* can now be started in boxes of light compost, and should be watered sparingly until well started. These we transfer to pots later on, and we find that tubers started later in the season and planted out from boxes do almost as well. Seedlings make excellent plants the first season. We sowed our seed early in February; when sufficiently large to handle these are pricked off into shallow boxes, and from these transferred to a gentle hot-bed where they are planted four inches apart each way, in light, rich compost. Strong plants are produced by the first of June.

Our earliest sowings of *Asters* and *Stocks* are now in rough leaf, ready to prick off. Of *Asters* we find *Queen of the Earlys* the best for an early crop, while *Boston Florists' Stock* comes in much ahead of any other sort we have tried. The latter makes a useful pot-plant, and we usually have some in flower for Easter by sowing in December. The main batch of *Asters*, *Stocks*, *Zinnias*, *Phlox Drummondii*, *Gaillardias*, etc., we sow about the middle of March. *Petunias*, *Lobelias*, *Verbenas* and a few other kinds are started a month earlier. *Salvia splendens* and its varieties, *Compacta* and *Le President*, are so easily raised from seed that it is not worth while keeping any plants for propagating purposes, and seed sown now will produce good-sized plants by the time they are required. As bench and shelf room is now pretty fully occupied, boxes of newly sown seeds can be stood several deep after being watered. This prevents the surfaces from drying and germination is likely to be better better than when the boxes become more dry and require almost daily waterings. Sowings may be made now of *Aralias*, *Grevilleas*, *Solanums* and similar plants useful for winter decoration. Such seeds as *Cannas* and *Ipomœa noctiflora hybrida* germinate more quickly if soaked in warm water for twenty-four hours before sowing.

Every one having a glass house plans for an attractive show of flowers for Easter. *Easter Lilies* constitute the most important crop and the one most difficult to have exactly on time. We like to see the buds distinctly on *Lilium Harrisii*, *L. longiflorum* and *L. candidum* when Lent begins, and then, whatever vagaries of weather may follow, by forcing or retarding, the flowers may be had on time. A good deal of nice calculation is required to get all *Easter flowers* in at the right time. Green

aphis will injure Lilies if allowed to get a foothold, and they must be held in check either by dusting the tips with tobacco-dust, syringing with tobacco-extract dissolved in water, or by fumigation. Callas are useful for decorative purposes; we grow the large tubers of *C. Æthiopica* in ten and twelve inch pots, placing three and five to each pot. The variety Little Gem, while not of value as a winter bloomer, is now commencing to flower freely, and is useful to mix with other plants. Grown in eight-inch pots these will each have five to eight open flowers by Easter. Callas are gross feeders, and strong liquid food twice a week improves them. Spiræas are among the most useful plants for Easter. We prefer *S. grandiflorum* to the older *S. Japonica*. *S. astilboides* makes an elegant plant; it is taller in habit than the others, with handsomely cut and showy foliage and minutely branched panicles of white flowers; it requires two weeks longer forcing than the *Japonica* type to bring it into flower. Spiræas must have plenty of room to develop their foliage, stimulants and copious waterings. They are easily injured by tobacco-smoke, and it is well to remove them to another house while any fumigation is going on. I have seen many fine lots completely ruined by neglect of this simple precaution.

Easter comes a week earlier this year than last, and Hydrangeas will require considerable forcing to have them in good flower. The heads on our plants are now showing white, and will be well expanded by the required time. We have had to retard *Cytisus racemosus* and Indian Azaleas, but they are now being carried into heat. Bulbous plants, such as Hyacinths, Tulips and Narcissus, require some three weeks from the time they are housed until they are in flower. If the weather is very warm and sunny they may need holding back; if the reverse, some extra forcing may be necessary. Paris Daisies, especially the white variety, Grallert, are useful grown in six and eight inch pots. Plants of *Antirrhinum* in six-inch pots, carrying five or six spikes, are effective, and can readily be brought into bloom for Easter in an ordinary greenhouse temperature. We purpose trying the white *Swainsonia galegifolia* as a decorative plant this year for the first time. Its beautiful white sprays of flowers should make it extremely popular, and it is of easy culture. Calceolarias and Pelargoniums will both be somewhat late for Easter this year. Neither of these plants tolerate forcing, so it is useless to attempt to hurry them forward. Green aphis is very partial to both, and we pack plenty of tobacco-stems among our plants. A cool airy structure suits them, and they relish frequent syringings overhead until the flowers begin to expand. The flowering Begonias are among the most cheery objects in a greenhouse at this season, and florists are giving more attention to their cultivation. While they have comparatively little value as cut flowers for decorative purposes, as pot-plants they are unexcelled. A good batch of cuttings for next winter's crop should now be inserted. Later in the season the old plants grow finely if planted out in a partially shaded border. For midwinter blooming *Begonia incurvata* (called also *carminata*) deserves special commendation; we have just put in cuttings of this excellent variety. The old plants if cut back give abundant cuttings from the base, and these are preferable to those taken from flowering wood. The Cornell Experiment Station is trying to get together a complete collection of Begonias, and it is hoped all gardeners and florists will send to that institution varieties and species it may not have. A primary object in making the collection is to establish correct nomenclature of Begonias.

Taunton, Mass.

W. N. Craig.

Caryopteris mastacanthus.—This neat subshrubby member of the Verbenaceae family is said to be hardy as far north as Boston. Thomas Meehan & Sons, of Germantown, state that they have thoroughly tested it for the last five years in their nurseries, and that it has been only slightly winter-killed. As the flowers are produced on the current year's growth this is no disadvantage, for, no doubt, like many other plants of this character, it will be benefited by being pruned annually. The plant branches freely from a woody base. The leaves are ovate and hoary, with adpressed, silky hairs in greater abundance on the lower surface. The flowers are lavender-blue, in dense axillary clusters, and are produced in great profusion during the months of September and October. It is one of the easiest of plants to manage, and in the greenhouse has been quite free from insect pests of all kinds. Our half-dozen plants were raised from cuttings taken from a plant purchased last spring. They made neat little bushes of ovate pyramidal form about two feet high. We grew three in six-inch pots, and they made the best of decorative plants. Those kept indoors ripened seed abundantly. The plant can be easily increased from cuttings as well, so that it will be plentiful.

Abutilon Souvenir de Bonn is the best *Abutilon* with parti-colored leaves that I have seen. The variegation is white and confined to a rather heavy banding on the margin of the deeply cut palmate leaves. It is a highly decorative plant, however used, and small specimens in pots are especially beautiful. For foliage contrasts in informal gardening it is most effective. The variegation does not seem to interfere with the vitality of the plants, and they are always healthy and vigorous. Unlike many *Abutilons*, it naturally forms a stocky bush of pyramidal form and never needs staking. The red-striped orange flowers contrast well with the foliage, as is not the case with the *Thompsoni* forms, which have yellow variegation.

Wellesley, Mass.

T. D. Hatfield.

Correspondence.

Decoration of School Grounds.

To the Editor of GARDEN AND FOREST:

Sir,—The subject of ornamenting our country roadsides with trees and shrubs has lately been treated interestingly in your columns, and I wish now to call attention to the tasteful planting of grounds about country schoolhouses. They stand at present, as a rule, as "ragged beggars sunning," without so much as a Sumach or Blackberry vine to adorn them. Not infrequently the playground is altogether omitted, and the children play in the road. Certainly the school-buildings in the country that are provided with pleasant grounds are exceptional, and although in a few instances sites have been chosen near native groves with pleasing results, planting is almost wholly neglected. This oversight where land is available and trees and shrubs can be procured at little or no cost, evidences lack of thoughtfulness on the part of the rural population rather than lack of taste. Children enjoy planting trees and seeds, but, as with other things, soon tire of the labor and care of cultivating unless stimulated by some unusual motive. The idea of ownership or proprietorship has been tried in many places with success, and children have been led to take pride in trees and shrubs placed under their care. As many children do not possess attractive homes the influence of a prettily decorated schoolhouse and grounds would add a much needed element in their education. The advantages to be derived by children from pleasant surroundings seem to have had little or no place in the arrangements for their earliest impressions at school in the country, where of all places the most natural beauty may be provided with the least exertion. Since childhood is the most impressible period of life it certainly is better to have schoolhouses and grounds comfortable and tasteful rather than inconvenient and unsightly. The remembrance of hours spent years ago in shady woods, among wild flowers and ferns, under orchard trees, or in old gardens, remains with us as we advance in life when later experiences are forgotten. Washington Irving wrote: "I thank God I was born on the banks of the Hudson! I think it an invaluable advantage to be born and brought up in the neighborhood of some great and noble object in Nature. I used to clothe it with moral attributes and almost to give it a soul." He traces to his companionship with it whatever is good or pleasant in his character.

Comparatively few are born with what are usually termed grand objects about them, but none in the country need be deprived of much that is refreshing and ennobling to the mind, provided the attention is early called to it.

White Pigeon, Mich.

Dorcas E. Collins.

John Brown's Grave.

To the Editor of GARDEN AND FOREST:

Sir,—The letter of Mrs. Van Rensselaer, in your issue of January 29th, in regard to the recent purchase by the state of New York of the John Brown tract, reminds me that it may be worth while to reproduce part of an article printed in *Kate Field's Washington*, under date of September 26th, 1894. This account was given to Miss Field by the Rev. H. C. Lyon, who lived in North Elba for several years and knew many of the Brown family personally.

"It is more than likely that of the tens of thousands who have visited the grave of old John Brown, at North Elba, in the Adirondacks, not fifty have ever heard the history of that inscription so deeply chiseled in the great granite boulder near the grave—'John Brown, 1859.' This boulder, with its clear-cut letters, will always be regarded as the real memorial. It is true that the thin stone slab which formerly marked the grave of Captain John Brown, the grandfather of John Brown,

stands at the head of the grave, and additional inscriptions record the names of John Brown and three of his brave sons, who died for the cause of freedom. It was the wish of John Brown that his name might thus be linked with that of his grandfather, who was a soldier of the Revolution. But long after this frail and ancient tablet has crumbled into dust, the giant boulder, with its classically beautiful inscription, will commemorate the name and fame of the Friend of the Oppressed.

"To the late Colonel Francis L. Lee, of Boston, Massachusetts, of the Forty-fourth Regiment of Massachusetts Volunteers, belongs the credit of establishing this imperishable memorial. For many years Colonel Lee had spent the summer months at his country home, 'Stony Sides,' on Lake Champlain, near Westport, New York, only about thirty miles east of North Elba, and had always entertained a high regard for the noble qualities of Brown, even before his exploits in Kansas had revealed to the world the stuff of which he was made. The year following the close of the war, 1866, Colonel Lee made a pilgrimage to North Elba, accompanied by some members of his family and the Hon. George S. Hale, of Boston, taking with him Mr. Andrew J. Daniels, of Westport, a skillful marble-worker. To Mr. Daniels Colonel Lee intrusted the task of cutting those large, deeply furrowed letters and figures in the flinty rock."

This cutting took many days, owing to the extreme hardness of the rock in which the letters are cut. This same hardness will protect the mighty boulder from the hand of the vandal relic-seeker for all time. I wish also to add my protest as a native of Essex County against putting any artificial monument over the grave of the rugged old man who lies buried among the surroundings of his own choice "with his face to the south." If there is to be a monument built from the accumulated funds spoken of in the letter, let it be at Harper's Ferry or some other place where it will suit its surroundings, but not on the old farm.

Chestnut Hill, Mass.

Francis W. Lee.

Recent Publications.

A History of Gardening in England. By the Hon. Alicia Amherst. London: Bernard Quaritch. 1895.

Miss Amherst's book is sure to be useful to any serious student of the history and literature of English gardening, and should also have a place in the library of every lover of gardens who takes an interest in the growth and development of an art which has a long past, since it started, we are told, in Eden. The History of Gardening gives evidence of long and careful preparation, and the author has grouped her facts so skillfully and with such a keen sense of historical perspective that the work is likely to become a classic of the craft with which it deals. Externally the book is attractive in its green cover, with the two quaint men digging and planting in an impossible garden, the sole decoration of which seems to consist in one or two microscopic twigs. The illustrations are less satisfactory, as in many cases the photogravure process has failed to reproduce the differences in light and shade of the actual scenes. The bibliography at the end is large and full, but, although there are some advantages in the chronological arrangement over one that is alphabetical, the latter is plainly more convenient. The short index of names, however, furnishes a much needed help to one who wishes to consult a given author. It would double the working value of this list if in another edition a little more information were given about the books on such points, for example, as whether or not they are illustrated, what is the best edition, etc.

The author begins by a few words on the probable want of gardens among the rough and warlike tribes which inhabited Britain before the Roman conquest, but passes on to the early Saxon times, when the monks, in their quiet communities, cultivated herbs and simples, while protecting learning and the refinements of life from the boisterousness of the mediæval world. An amusing part of the book is that in which Miss Amherst treats of the expenses of monastic gardening as shown in the pipe-rolls and chartularies of the period, where one may see from the charge "for labour of labourers in extracting 'mosse' from the

cloister green, 6d.," that weeds grew and had to be pulled up as much in the middle ages as they do now. The Hortulanus, or Gardinarius, was an important person in the Priory, since he had charge, not only of the garden, but of the orchard, vineyard, moat and fish-ponds, and it was also his duty to see that the church was decorated with suitable flowers.

As soon as England began to recover from the many wars which kept people shut up in walled towns and in castles, where want of space prevented any but the most necessary cultivation, gardens multiplied, and an association of gardeners became so powerful that they forced the Mayor and Aldermen of London to recall an order which had been issued forbidding them to hold a market in front of the church of St. Austin.

The literature of the fourteenth and fifteenth centuries is full of references to sweet-smelling flowers and green lawns, while some of the illuminations in old manuscripts of that time are views in gardens where ladies sit upon turf seats and weave "gerlonds" of roses or periwinkles. Later, in Tudor times, when houses did not need to be surrounded by high walls, and people had time to think of something besides fighting others and defending themselves, the pleasure-grounds began to be more elaborate, and the topiary artist, who in later times was to create such extraordinary objects in Yew, was called in to pleach alleys and hedges. Galleries and mounts also make their appearance, and flower-beds fenced with brightly painted trellises. In short, one feels that here is the fresh and fair beginning of the simple, hearty country life which has continued to grow until the present time. Miss Amherst also shows that in the reign of Elizabeth gardening did not lag behind the other gentle arts, since Bacon's well-known essay was only one of the many treatises on the subject which were written about that time. The garden became a part of daily life, inasmuch that the architect, John Thorpe, designed the surroundings for his houses, thinking the plan of the garden important enough to require an artist for its proper and harmonious distribution. The author also glances at the humbler kitchen-garden, where the list of vegetables has constantly grown longer and the methods of cultivation more technical.

In the time of the Cavaliers and Roundheads the love of gardening grew steadily in favor, both with the working classes and the gentry, as shown by the well-known Royalist names of John Evelyn, the author of *Sylva*, and Lord Capel, whose famous garden was at Kew. Toward the end of the seventeenth century the influence of the pomposity of Versailles was felt in England, since Le Nôtre is said to have been ordered by Charles II. to make designs for the elaborate alterations at Hampton Court, which were afterward only partly carried out. It was natural when William and Mary were on the throne that Dutch gardening should become the fashion, and accordingly we see a great remodeling of old places going on, largely under the superintendence of Hollanders, who, doubtless, brought with them the taste for cultivating Tulips, which became a mania in their own country.

Miss Amherst's sketch of the rise of landscape-gardening is most interesting, since she shows how the reaction against the excessive formality of the later gardens created a style which, in its affected simplicity and naturalness, grew to be quite as artificial as the one it had superseded. The author also emphasizes the enormous amount of damage done to fine old places by the "improvers," who cut down avenues of grand old trees because they considered them neither "pensive, picturesque, nor sublime." A short account of the progress of horticulture in this century, with a few appreciative remarks on some modern gardens, closes this attractive book. Its mass of well-ordered and well-digested information, with constant reference to original authorities, gives it a genuine value, and it has the charm of being written in an easy, flowing style which is never dull. It is altogether the best existing treatise on the subject, and it is not likely soon to be superseded.

Notes.

The Puget Sound University owns what is called a residence park of some twelve hundred acres south-west of the city of Tacoma, and it is proposed to devote some two hundred acres of this, where the soil is most suitable, to an arboretum of such trees as will grow in the remarkable climate of that region. The amount of land available is so ample that room can be given for a large collection. Some ten thousand young plants of two hundred and fifty species, native and foreign, already form the nucleus of the proposed tree museum.

As a proof that more Olive-trees have been planted during the past season than ever before in California, a recent dispatch to the *Tribune* states that a single nurseryman in Pomona has sold 200,000 trees, that Mr. Andrew McNally, the Chicago publisher, is planting an Olive orchard of four hundred acres in Orange County, and Mrs. Adlai Stevenson is preparing 340 acres in San Bernardino County for Olive-trees. All the Olive groves in southern California were profitable last year and the demand for California olives constantly exceeds the supply.

Mr. William Falconer, editor of *Gardening*, has accepted the position of superintendent of the park system of Pittsburgh, Pennsylvania, which has been vacant since the death of A. W. Bennett. Mr. Falconer has been in this country some twenty years, and during the latter half of this time he has had charge of Dosoris, the well-known estate of Charles A. Dana, Esq., on the northern shore of Long Island. He has had an unusually wide experience in the various branches of gardening, and the new parks of Pittsburgh are sure to be managed with intelligence and skill.

A Farmers' Bulletin on Potato Culture has just been issued by the United States Department of Agriculture, which, while not intended as a complete treatise, contains many helpful suggestions in relation to a crop which is grown in every state and territory of the Union, and which amounts in value every year to a hundred million dollars. Such questions as when to cut tubers for seed, the quantity of seed per acre, the size of the pieces, the value of mulching, and the proper methods of harvesting and storing are discussed in the pamphlet, which contains twenty-three pages and is filled with useful matter.

An effort to explain the physical geography of one of those narrow but well-defined areas to which the successful cultivation of certain classes of fruit is often confined, is found in Bulletin 109 of the Cornell Experiment Station, and entitled the Geological History of the Chautauqua Grape Belt. This region is very plainly defined, and the inquiry was undertaken to determine, if possible, the reasons for the existence of this particular belt, and to ascertain whether its limits might be profitably extended. The work has been done by Professor R. S. Tarr, of Cornell University, and it contains much interesting research, both on the soil and on the climate of the Chautauqua Grape fields, and gives reasons why they are specially adapted to all the fruits common in this latitude. Altogether, it seems to be a peculiarly favored spot, and Professor Tarr suggests that even the Tobacco plant might be profitably grown there.

In a bulletin rather more than two years ago concerning Japanese Plums in North America, Professor Bailey stated that these Plums are the most important type of fruit introduced into North America during the last quarter of a century, and deserved to be carefully tested in all parts of the country. Of course, this did not mean that the Japanese Plums were superior to the European Plums of the *Prunus domestica* type, for, wherever these will succeed, they are still more valuable, although the Japanese can be added to give a variety. The advantages of the Japanese Plums are that they are adapted to a wider range of country than the European type, and among other desirable features which they possess in various degrees are earliness, productiveness, freedom from black-knot and leaf-blight, with long-keeping quality and beauty of fruit. Several of them compare favorably with the Lombard in quality, but it must be admitted that they are generally inferior to the best European Plums.

The first California grape-fruit of this season to reach this city was sold on March 3d and comprised a car-load, or 300 boxes. Much of it was small and below the desirable sizes of fifty-four and sixty-two to a box. The best realized \$8.00 at wholesale, a few boxes containing from 150 to 200 of the fruits bringing but \$2.00 each. Nevertheless, the entire lot averaged \$6.00 a box. The color was light and the weight not heavy enough to insure first quality. Some shaddocks, from the Barbadoes, are now forced into the market; these are of irregular

form, their uninviting lemon color marked with green. Altogether pleasing are the handsome Forbidden Fruits from Jamaica; these are large, spherical, the smooth skin a rich orange-color and of oily texture. The fruit is free from bitterness and exceedingly juicy. These have realized \$7.00 to \$8.00 a box. No Tangerines or Mandarins have come from California during the past fortnight, and the season for them is nearly ended. The limited stock on hand is offered at \$3.00 to \$4.50 a box. The supply of pears for the remainder of the season is now practically controlled by one firm. Winter Nelis are offered at \$5.50 to \$6.00 a box to wholesale buyers, Easter Beurrés bringing a half-dollar less, and large russet P. Barrys \$4.50 to \$5.00.

The extensive mycological herbarium of Mr. J. B. Ellis, of Newfield, New Jersey, has been purchased by the Board of Managers of the New York Botanical Garden, and will be deposited in the fire-proof museum building of the Garden which it is proposed to erect in Bronx Park. The purchase also includes a considerable portion of Mr. Ellis' library, and the collection will be brought to this city within a short time and placed in a fire-proof storage warehouse until it is finally placed in the Garden. The herbarium represents the work of nearly fifty years devotedly given by Mr. and Mrs. Ellis to the study and accumulation of Fungi from all parts of the world. It is especially rich in North American species, being very nearly complete in that regard, and containing all or nearly all the types described either by Mr. Ellis alone or in coöperation with Dr. M. C. Cooke, Mr. B. M. Everhart, Mr. E. W. Martin, Professor W. A. Kellerman, Rev. A. B. Langlois, Mr. E. D. Holway, Mr. B. L. Galloway and others. It is put up in volumes, there being some 250 volumes of published exsiccati, including all but a few of the earliest distributed sets, and more than 150 volumes of a general collection, the whole completely indexed on a card catalogue. There are also more than 100 tin cans and boxes filled with fleshy fungi. This important acquisition will make the new institution a centre of interest for students of these plants, and with the other collections already secured will make a substantial foundation for a great herbarium.

An array of vegetables, such as may be seen any Saturday morning in our large markets and first-class green-grocers' stores, presents almost as wide a range of color as a collection of flowers. Besides this diversity of color there is the delightful freshness and crispness of stems and foliage and the beauty of plump roots with clinging soil, while the whole place is pervaded with the wholesome and satisfying earthy smell which reminds one of spring in the country. Green is, of course, the prevailing color, and is seen in many shades and tints now, especially in herbs for seasoning, and salads. The fine-leaved chervil, delicately fragrant tarragon, and the more pungent mint are abundant, while curled parsley, rank-growing chives in their native sod, forced dandelion, corn salad, spinach and kale, tight bunches of perfectly grown watercress and celery, heads of curled endive, escarolle, Romaine and other lettuces, each has its particular tint, and the so-called French salad is specially noteworthy for the white midribs and pale lemon-colored blades of its leaves. Excepting Sugar corn and Lima beans, all the summer vegetables may now readily be had in abundance, although prices have advanced recently, owing to cold weather in northern Florida and the other states of the south Atlantic coast. The main supplies now come from along the coast of southern Florida. New egg-plants, small, glossy and rich purple in color; snowy white cauliflowers, in their green envelopes; choice grades of asparagus in generous-sized bunches, and long grass-green peppers, with occasional splashes of red, are heaped among masses of golden pumpkins, rusty green okra and French artichokes and the earthy brown celeriac, long light straw-colored parsnips and pale green squashes. Neatly piled heads of imported cabbage, glossy and rich purple-red, are showy beside the dull red of beets. Russet-colored mushrooms and oyster-plants, the less well-known kohlrabi, waxy green cucumbers, fresh-looking well-filled pea-pods and yellow and green string-beans are in all well-stocked offerings of vegetables. New leeks and spring onions are shown, and full-grown onions, in all sizes, in satiny skins of silver, red and yellow. There are slender stalks of bright pink rhubarb, and field tomatoes lacking summer richness of coloring. Sweet potatoes, red-jacketed Bermuda potatoes, clear white and purple turnips and the dull cream-colored rutabagas are common enough. Perhaps no one vegetable makes so decided an impression on the eye as a lot of carrots, especially when these small clear lemon-yellow roots are lighted up by a neighboring gas-jet.

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The Cascade Range Forest Reservation in Danger.

THE effort now on foot to restore to the public domain for entry and sale a large proportion of the land which makes up the great Cascade Range Forest Reserve, in Oregon, will cause little surprise. We wish it could be added that it causes no apprehension. The simple truth is that it is only one more evidence that these forest areas which have been reserved by Presidential proclamation will be attacked one after the other and again and again by powerful well-organized forces of men who have a personal interest in getting possession of them. Of course, so long as there is no specific legislation for managing these reservations, no provision for punishing skin-hunters, timber-thieves or sheep-herders, the forests will be open to these and other marauders. League after league of the finest timber in the world has been wastefully chopped down or burned over; league after league of young forest growth has been girdled and trampled to death by the millions of sheep that have been pastured on national property. These wounds, bad as they were, might heal over, at least partially, in the slow process of time, but attacks like the one on the Cascade Range mean the final and total destruction of the woods and the utter defeat of the purpose of the law which made the creation of these reservations possible—the one law in all the great mass of legislation relating to our public domain which had in it any immediate promise for the future of our forests.

The assault upon this particular reservation is wanton and selfish to the last degree, and it is to be hoped that the Secretary of the Interior will stand firm and refuse to turn this area over to private use and reverse the policy of holding it as the property of the people forever. Before this Cascade Reserve was created a long and careful investigation was made by competent members of the Geological Survey and others, so that its resources and possibilities are all well known. It embraces high mountain ranges where there is a large rainfall and snowfall, just the place where a forest cover is absolutely necessary to the adequate and equable water-supply of the plains below. Only limited portions of the region are fit for agricultural use and the rugged slopes are adapted to forest growth alone. Oregon has been inhabited for fifty years, and

yet but very few settlers have made their homes within this great area, a fact which of itself proves that it is not a desirable place of habitation. Very little mining land is included in it, and although much good timber is standing there, the lumbering on the Coast Range is better, so that there is no urgent need of felling the forests of the reservation. Of course, the wandering sheep-herders who gain a subsistence by preying upon the national property are clamoring for more land to devastate, and they are especially urgent now since they have been driven northward from the forests of California, which they have laid waste. Altogether, turning over these mountain forest lands to private use will only benefit a few individuals, and of that particular class whose very occupation it is to destroy the forest and break up those beneficent conditions which, in the end, will benefit the greatest number of people for all time to come.

We are glad to see that the executive committee of the American Forestry Association adopted vigorous resolutions at its meeting on March 4th against the opening of this Cascade Reserve either in whole or in part, and that they have addressed a memorial to the Honorable Hoke Smith, Secretary of the Interior, protesting against any action that threatens the integrity of the reservation or a reversal of the policy which has created them. We are glad to see, also, that they take broader ground than that of a mere protest against a special case for special reasons. They show very plainly that the mere reservation of public lands is not a policy with any life or force in it. They recognize, also, that even if the reservations could be kept rid of trespassers, either by the army or any other force, this alone would not give them their proper place in the national economy nor establish their proper relations with the people and the people's interests. The forests must be saved where they are needed to protect and enrich the plains, but they must be saved for use. The people have a right to demand that they shall be productive, and increasingly productive wherever this is possible. Beyond question, also, the settlers in regions adjacent to the Government forests ought to be able to draw from them the supplies that will in many cases be absolutely necessary to their existence. Some of them may contain land more suitable for agriculture than for the production of timber, and a wise national policy will not fail to provide that every acre can be turned to its highest and most fruitful use. In short, all the necessary and reasonable demands of the people which do not conflict with the essential permanence of these reserved lands as forests must be fairly and frankly met.

It is very plain that not an acre of the national domain which is now in forest, whether within or without one of the reserved areas, is safe until some comprehensive scheme of administration is put into active operation. There must be some authority to decide what part of the public forests shall be held under Government control, and which shall be allowed to pass into private hands; and then some broad scheme of managing these forests which will commend itself to the enlightened public opinion of the country must be adopted and enforced. Simply shutting up and fencing in large tracts of forest is no policy at all. The ultimate policy must clearly be conservative. The forests are first of all to be protected, but they must also be judiciously worked and used. They must be carefully husbanded and their productive power preserved, but they must furnish supplies to settlers and others, and, under proper restrictions, access must be had to all the resources of the region, whether agricultural, mineral or forestal. A wise forest policy is not opposed to any legitimate right of the people in the forest. It is really the only certain way to establish and perpetuate these rights.

We cannot protest too strongly against this assault on the Cascade Reservation, but we may as well face the certainty that if this attack fails another and a more violent one will soon be organized. No reservation will be secure until all of them, together with all the national domain

which it is intended to hold in forest, are placed under a wisely regulated forest service—a service which will be for protection primarily, but never for stagnation, and always for development and use.

AN Audubon Society has lately been organized in Boston, in the hope of arousing the community to the fact that the fashion of wearing feathers means the cruel slaughter of myriads of birds and threatens the extermination of some of the most beautiful of those which inhabit the United States. Its purpose is to discourage wearing and buying for ornamental purposes the feathers of wild birds and to further the protection of our native species. The circular of the society cites as an instance of the evil it would restrain the aigrette which is now so commonly worn by ladies, and which is made from the feathers of the Egret, or Snowy Heron, the plumes being obtained by killing the mother at the time of the year when she is hatching or rearing her young, so that, in nine cases out of ten, her death causes the death of her brood. The result of this has been that the Snowy Heron, one of the most beautiful of American birds once common in the southern states, has already become exceedingly rare, and its extermination must be only a question of a short time longer unless the fashion in aigrettes changes or their use can be discouraged.

A subscription of \$1.00 and a written agreement not to purchase or encourage the use of feathers of wild birds for ornamentation entitles any one to become a member of the society, which includes among its officers some of the most distinguished men and women of the commonwealth. The objects of such a society appeal not only to lovers of nature, but to every man, woman and child interested in the prosperity of the country, for birds are the farmers' and gardeners' friends, destroying annually countless millions of insects which, without their aid, would devour the profits of the husbandman. Such a cause should have the support of all civilized men and women, and such societies should be organized in every state to carry on an active campaign against the wickedness of a fashion which destroys beauty and life to gratify human vanity in one of its lowest forms.

Miss Harriet E. Richards, Boston Society of Natural History, Berkeley Street, Boston, is the secretary of the society, to whom applications for membership should be addressed. There is no annual assessment.

New Perfumery Products.

THE perfumer's art has not until recently availed itself of chemistry or strictly chemical operations. Primary articles have been the results of enfleurage, distillation, percolations, expression, decoction or similar operations. The basis of all good perfumes is, and probably always will be, the spirituous extracts which are produced from a few flowers, mostly rose, cassie (Acacia), jasmine, orange, jonquil and violet.

This extract is produced by washing the pomade or grease which has absorbed the molecules of odor from the fresh flowers, the latter process being known as enfleurage. Alcohol has a greater affinity for the molecules than the grease, and hence quickly robs it of odor. It is evident, of course, that a more direct process could not be used, as alcohol applied directly to the flowers would absorb detrimental organic compounds. This extract supplies a mellow floral body to compounds or perfumes which is not otherwise obtainable. Except the rose, none of the flowers mentioned above are distilled for their essential oil. This product in the case of the rose, reduced with spirits, has an entirely different odor from the enfleuraged product, and the same may be said of any flower which it is possible to treat both ways. The simple addition of essential oils to spirits produces a compound lacking in body and richness.

With a basis of these floral extracts the skillful perfumer undertakes to produce synthetically any desired odor, add-

ing, as his experience suggests, various essential oils or infusions of roots, leaves, seeds, resins and animal matters, the latter usually to insure permanency or to bind the somewhat various scents composing the combination. These scents all vary, according to their molecular arrangement, and have such differing evaporating points that an expert can analyze a complicated perfume by simply picking out the separate primary odors as they become successively prominent in the evaporation.

The perfumer's art has been brought to great perfection in the production especially of pleasant "bouquets," and, in a minor degree, simple floral scents are made, which, with nice labels and some imagination, are enabled to pass as fair representations of the odors of popular flowers. A delicate sense of odor is a rare gift, and few persons are familiar with the true scents of the most ordinary flowers, and the ordinary consumer is not critical, requiring only that the article be fragrant pleasing and lasting. Fashions change in perfumery, and it will be noticed in any assembly that the present taste is for pronounced odors of the most offensive type.

The chemist has lately had some rare successes in synthetic work and has given the perfumer some products which simulate floral odors with fidelity. One of the newest products of chemistry is ionone, or artificial odor of violets, with which in combination the perfumer is now enabled to produce an extract of violets which not only simulates quite perfectly the odor of violets, but is of remarkable permanency and, more important, has certain striking qualities which appeal successfully to the popular taste. Very perfect extracts of violets are made from the flowers, but if pure these are very delicate and evanescent. Ionone is an interesting chemical compound produced by starting from citrol (a constituent of oil lemon). It is impossible to accurately estimate the exact limits of the new chemical products as used industrially, but as they all seem to depend somewhat on oxidation to develop the full odor, their weak point would naturally be an eventual degeneration, unlike natural products whose oxidation is extremely slow.

Another commercially valuable odor is artificial musk, Musk Baur (or, chemically, trinitroisobutyl toluene), which is successfully used as a base or binder in many perfumes where its presence would not be suspected by the layman. Terpinol (Laird) is a direct product of spirit of turpentine, which in combination reproduces the odor of Lilac blossoms perfectly. The old-fashioned extract of Heliotrope of the perfumer was, at the best, a fiction, and usually unstable and unsatisfactory also from its dark color, which stained linen. The Piperonal or Heliotropine of the chemist produces, with Jasmin spirit and coumarin, an extract perfect in odor and so colorless as to be known as extract of White Heliotrope.

Coumarin is the odorous principle of Tonka Bean, Wild Vanilla, Woodruff and Sweet Grass (*Anthoxanthum odoratum*). It is now prepared synthetically and is practically used as a substitute for the natural products, largely in scenting tobacco.

Vanilla is a minor article with the perfumer, being used most largely for flavorings, but, as it seems to be associated with the trade, it may be well to note that vanilline, or artificial vanilla, has proven a commercial success, and largely replaces the seed-pod of the Orchid.

There are various other synthetic products which are in a more or less forward state, notably those which seek to replace neroli and the rose, but they are scarcely out of the experimental state. For a long time the maker of soap has been using ethers and aldehydes, which are cheap sources of such odors as oil of wintergreen, oil of bitter almonds, etc. The chemist has now classified most flower odors into a few typical sections, as the indoloid, aminoid, parafinoid, benzoloid and terpinoid, according to the molecular arrangement of the odoriferous principle. These sections do not include the great number of flowers with the honey scent, as sweet pea, honeysuckle, etc., whose molecular arrangement has not been determined with cer-

tainty. With the constant progress in organic chemistry there does not seem any reason why any desired odor should not be artificially produced.

Elizabeth, N. J.

J. N. Gerard.

A Botanical Journey in Texas.—III.

ALPINE is a pleasant mountain-girt town of two or three hundred Americans, and, perhaps, of as many Mexicans. It is the county seat of Brewster County. This year it was plain that the town and surrounding country had been left out in the almost universal distribution of rains over Texas, still in damp places numerous plants were in blossom. The little *Zinnia grandiflora* and taller *Berlandiera lyrata* are common, and as both species are found in Kansas they were old friends. More gladly I found here, for the first time, the rather handsome *Martynia fragrans*, Toloache of Mexicans. Growsome tales are told of its vicious nature, and Mexican girls are said to use it to rid themselves of their rivals in love, since the plant, it is claimed, produces gradual insanity and finally death to the victim who eats it.

In our journey from Alpine to Marfa we crossed in the night the highest point reached by the Southern Pacific Railway between New Orleans and San Francisco, a distance of nearly twenty-five hundred miles. That point, Paisano Pass, is 5,082 feet, and Marfa itself is 4,682 feet above the sea. Its flora, therefore, may be considered alpine in its character. It is the highest mesa that we shall find in the state. The orography of western Texas, while neither grand nor sublime, is interesting and pleasant to see. We are now about seventy-five miles from the Rio Grande, and shall not again see it until near our destination.

There is a small arroya winding around Marfa. Its sands are not even damp, but along it grow large clumps of *Fallugia*, now white with its rose-like flowers; huge *Yuccas*, so tall that their flowers cannot be reached; the handsome Willow *Catalpa* and fragrant *Acacias*. A small solitary Hackberry (*Celtis*) grows near by, even to fruiting capacity. Its leaves are thick and hard almost as a board, but still doing the tree that bears them their natural service. Care has been taken to collect specimens of Hackberry from Kansas and Missouri to western Texas and New Mexico, to learn finally, if possible, what specific differences may be made of its largely variant forms.

Near the dry watercourse I found a few living individuals of a tiny dark red-flowered *Oxalis*, which botanists hitherto appear to have failed to notice and describe. *Microhamnus ericoides*, a queer little thorny shrub, was growing in company with *Acacias*. It was out of blossom, but well loaded with nearly ripe fruit. Another species of *Zinnia* with purplish flowers grows here with *Z. grandiflora*. It looks as if it was here for its health. The handsome *Eupatorium* is commoner here than I have seen it elsewhere; so are *Perezia Wrightii* and the little *P. nana*, the last-named species being very small, but it has learned, with the other members of the genus, to deposit the brown wool at the roots. Dr. Havard's Evening Primrose, (*Enothera Havardi*, I met here for the first time. It is a handsome small-growing species. Just at close of day its bright yellow flowers pop wide open, and almost illumine the surrounding darkness. A low-growing *Asclepias* begins to appear at Alpine. It bears large clusters of purple flowers. We shall meet it more or less often to New Mexico.

Populus Fremonti, the commonest western Cottonwood, is now often seen either in cultivation or wild. It is a smaller tree than *P. monilifera*, with smaller leaves, which are usually truncate at the base, the basal portions being destitute of serratures. The pistillate forms are now loaded with fruit, which is dropping. The copious light down attached to the seeds is a fine plaything for the wind, which scatters them everywhere to the annoyance of the people, who should plant out only staminate trees, which bear no seeds. They might easily raise such trees from cuttings of trees of that form.

Hoffmannseggia stricta is the most abundant species of

that genus over the entire alkaline region of the southwest. Its tuberous roots are collected and eaten roasted by Mexicans. It is sometimes called "Wild Potato." Mexicans call it "Camote del Raton," which being interpreted is The Rat's Potato, alluding to the wood rat of this region, which loves this root as well as the natives and eats it as readily, and unroasted. This species is becoming shy in seed-bearing, perhaps because it propagates itself by its roots as well as by its seeds, and the two methods seldom long exist harmoniously in the same plant. *Lepachys Tagetes* is common along our entire route. It grows in the driest places if it is necessary, but, like all sensible plants, preferring more favorable conditions. It is a lower and more rigid plant than its congeners, with shorter rays that are often purple. The species extends northward to Colorado, and in Kansas to the Saline River.

Riddellia tagetina is one of the most common composites from the lower Rio Grande region to Colorado, and to south-western Kansas, where I have seen the prairies of Clark County yellow with its flowers. It often assumes a rounded conical form, with its yellow flowers half-hidden among the green leaves, when it is very handsome. The large-flowered *Lepidium alysioides* is found at this station, its clustered stems, when in full bloom, often presenting a mass of white flowers a foot or more in diameter. *Tribulus maximus*, a widely distributed species growing in Cuba and Florida to Mexico and California, and northward to Colorado, and in Kansas to the thirty-ninth parallel, is very abundant in all this region. It is a prostrate plant, often spreading three to four feet, with three to five pairs of leaflets, and bearing diurnal small yellow flowers, succeeded by a bur-like fruit; hence its generic name. Its south-western congener, *T. grandiflora*, has a more limited range in the United States. It is more erect in habit, with five to seven pairs of larger leaflets and large orange-red flowers. This species is very handsome when in blossom, and is sometimes seen in cultivation.

In the lowlands, as we have come up from the Nueces River, thousands of stately *Yuccas* grow. Their wand-like stems and large lily flowers gave, as we passed them, a scene of chaste beauty not soon to be forgotten by those who from the car-windows observed them. There are few more showy native plants in cultivation or wild, in Texas, or in the country, than the golden-flowered *Columbine*, *Aquilegia chrysantha*. It is found in western Texas and extends into New Mexico. The Tree Cactus, or Cane Cactus, *Opuntia arborescens*, enjoys the dry but mild and healthful climate of the elevated plains of western Texas, and of the region northward to Colorado. The abundant and, when ripe, yellow fruit of this species makes it almost as conspicuous in late summer as its handsome purple flowers do in early summer.

Among many rare and peculiar plants of western Texas is Dry Whisky, *Mamillaria fissurata*. Mexicans know it as "Peyote." This queer Cactus is said to be a powerful intoxicant. Nature gives us so many stimulants that it almost seems that they are made for use. The common Mistletoe, *Phoradendron*, is abundant and grows to a large size on the western Cottonwood from lower down the river to New Mexico. Its stems are sometimes two or more feet long. In Texas this species, including variant forms, grows upon Hackberry, species of Elms, different Oaks, Mesquit, Ash, Osage Orange, Cottonwood and *Forstiera*. I have never seen it growing upon Apple-trees, as it does in some more eastern states. It is sometimes so voracious as to kill all limbs upon which it grows above its point of union with them. Botanists are, doubtless, in error who think that this species comes into Texas from the west; it is much more common in central and eastern than it is in western Texas. It grows in the Indian Territory, Arkansas, south-east Kansas, Missouri and eastward across the country.

Houttuynia Californica is the name of a remarkably made western plant. It is not likely to be found so far from the river as Marfa, but it is common along the Rio Grande from Texas up as far in New Mexico, at least, as Albu-

querque. On the alkaline flats near that city it is the commonest weed. The species extends also to California. It is a semi-aquatic, growing one to two or more feet tall, bearing few leaves and a close spike of small white flowers, with a bract of the same color at the base of each flower, the whole inflorescence being surrounded by an involucre of petal-like white leaves. Its nearest relative here, but a remote one, is the Lizard's-tail, *Saururus cernuus*, of our north-eastern states, a plant also found in eastern Texas and westward to the ninety-seventh meridian or near it.

La Junta, Colo.

E. N. Plank.

Juniperus communis.

THE common Juniper, the Paria of the European coniferous trees, grows over wide areas, especially in the north, on barren, gravelly and stony soil, almost unavailable for cultivation. In a great number of varieties, from the dwarfed, procumbent forms of the higher Alps and the extreme north, to the small but handsome trees of the lower plains, this despised but bright and cheerful plant lends a great diversity and beauty to the landscape. In most regions it is associated with purple Heather and cross-leaved Heather, *Empetrum*s growing in immense tufts, and dwarfish Birches gnarled and twisted by high winds and starved into peculiar shapes. The Blueberry, the Cranberry and other ericaceous plants abound in the beautiful glades formed by these ever-varied trees. Under its sharp branches the young seedlings of Birch and Alder find protection against the destruction of browsing cattle, and so to some extent the more valuable trees in a young state are sheltered and guarded from injury. Unlike our Red Cedar, the Common Juniper is of a bright green color, particularly during winter and spring, but there are also more or less silvery or glaucous varieties intermixed, such as the Swedish Juniper, which, after all, is a rather unattractive plant. The more common conical, irregularly pyramidal or roundish forms of a bright green color, found all over northern Europe, are, on the other hand, very beautiful. The Juniper woods offer a peculiar irregular and varied aspect. Trees of large size, twenty to thirty feet in height, form the centre of numerous irregular groups around which the younger plants in many different sizes spring up in abundance. There are always wide vistas of Heather and Blueberry, patches of Eagle Ferns, and here and there, under clumps of Birch, Alder and Hagberry (*Prunus Padus*), many kinds of Ferns and herbaceous plants.

The Juniper is the advance-guard of the forest. It appears in masses where the forest has been destroyed; it nurses the young seedlings into trees, and when the shade of other trees in due time becomes too great, it disappears, to spread over more open ground nearby. The wood of the Juniper is hard, whitish and very fragrant. Many useful things are made of it, such as tankards and drinking-cans, which are often carved in beautiful and artistic designs, wooden spoons, paper-knives, pails and vessels of many descriptions, and handles for many different utensils. The wood is valuable in many ways, strong and durable, and when burned for fuel gives off a refreshing fragrance. It is often used in gardening for poles and stakes, beautiful and very durable fences for enclosing cottage gardens and many other purposes. The fruit, a berry of bluish color, is gathered and used in the preparations of drinks and liquors, particularly for the flavoring of the non-alcoholic home-brewed ale, so common in Scandinavia, which always stands on the table of the "Stuga" in a can of Juniper wood, ready for the thirsty traveler.

Because so common, it is not esteemed at its full value as an ornamental tree, but as such it possesses qualities far superior to many of the *Arbor Vitæ*s and *Junipers* commonly grown in gardens. Unfortunately, it is not easy to establish, unless raised from the seed or cutting in a nursery and frequently transplanted. Light gravelly, sandy and stony soils, and preferably moist positions, are the best. Here it retains its more pleasing characters—freshness and

brightness of color. Its most natural, and also most pleasing, associates in the garden, as well as in the woodland, are White Birches, Spruces and plants of the *Erica* family.

Newark, N. J.

N. J. Rose.

The Dauphin Chestnut.

CHESTNUT-TREES of stately proportions and dignified expression are of such frequent occurrence throughout the eastern states that mere size does not entitle any one tree to be singled from the many, but there are others, as, for example, the great Chestnut at Dauphin, Pennsylvania (see page 115), whose surroundings, as well as their appearance, give them a claim to distinction. Dauphin is a small town on the Susquehanna, directly above the water-gap in Second Mountain, and lies between the river and mountain, with a stream, Stony Creek, running through the town. The most attractive point for the visitor is a small and now apparently abandoned farm on a shoulder of the mountain, almost overhanging the river, less than five minutes' walk from the railway-station, and little farther from the town. In what is still rather open ground stands the great Chestnut, six feet in diameter, and of unrivaled dignity, and, although one of its limbs has been blasted by a stroke of lightning, there is no other tree in the vicinity that equals it in impressiveness. The land on which it stands is high enough on the mountain-side to possess forever an unobstructed view of one of the most beautiful reaches of the Susquehanna, which has cut far into the broad lateral valleys and spreads like a lake between the Dauphin water-gap and the next upper one, four miles above. The wild shrubbery growing along Stony Creek includes *Ilex opaca*, the only place it is found in this region, and on the mountain-sides are famous Laurel thickets, but the charm of the knoll where the Chestnut stands is in its far-reaching view.

Places like this shoulder, or promontory, assert the fact that people care less for mere beauty than for many other things. The place is a rest and refreshment, and to the casual visitor suggests itself as an ideal spot for a small park or reservation, and it is only one of thousands equally beautiful scattered through the country that might now, at very slight expense, become places of recreation for each growing town.

As a general thing, the only places of recreation now to be found in central Pennsylvania, with exceptions, of course (and notably at Reading and Harrisburg), are grounds leased by or belonging to railway and trolley companies. The trolley companies well deserve their dividends, for they have made accessible to the general public many points that were either kept as private grounds, or because of their distance from towns and cities could not be reached by women and children who now visit them daily by thousands in summer.

Leaving aside the larger centres, there is hardly a town of the type represented by Dauphin that has not close at hand some special point—a spot generally valueless for agriculture—such as this abandoned farm, with its primeval Chestnut. Sometimes it is a waterfall, and these are very rare in central Pennsylvania, or it is a grove of trees, or extensive meadows, or bluffs like Chiques Rock, but there is not a town or village that does not possess one spot worth reserving for public use.

Fifty years from now, when parks and playgrounds will be as much a feature of ordinary life as the water-supply and police are at present, our present apathy in providing for the helpless members of the community will be incomprehensible; but, apart from that provision, perhaps it will also be felt that the most valuable portion of a town or village is not that possessing the most expensive architecture, but that where some elements of natural beauty may be found.

Perhaps some time the original meaning of Pennsylvania (from the Welsh "Penn," for headland), the "head woodlands"* may be recalled, and the most distinctive feature

* Hazard's *Annals of Pennsylvania*, p. 500.

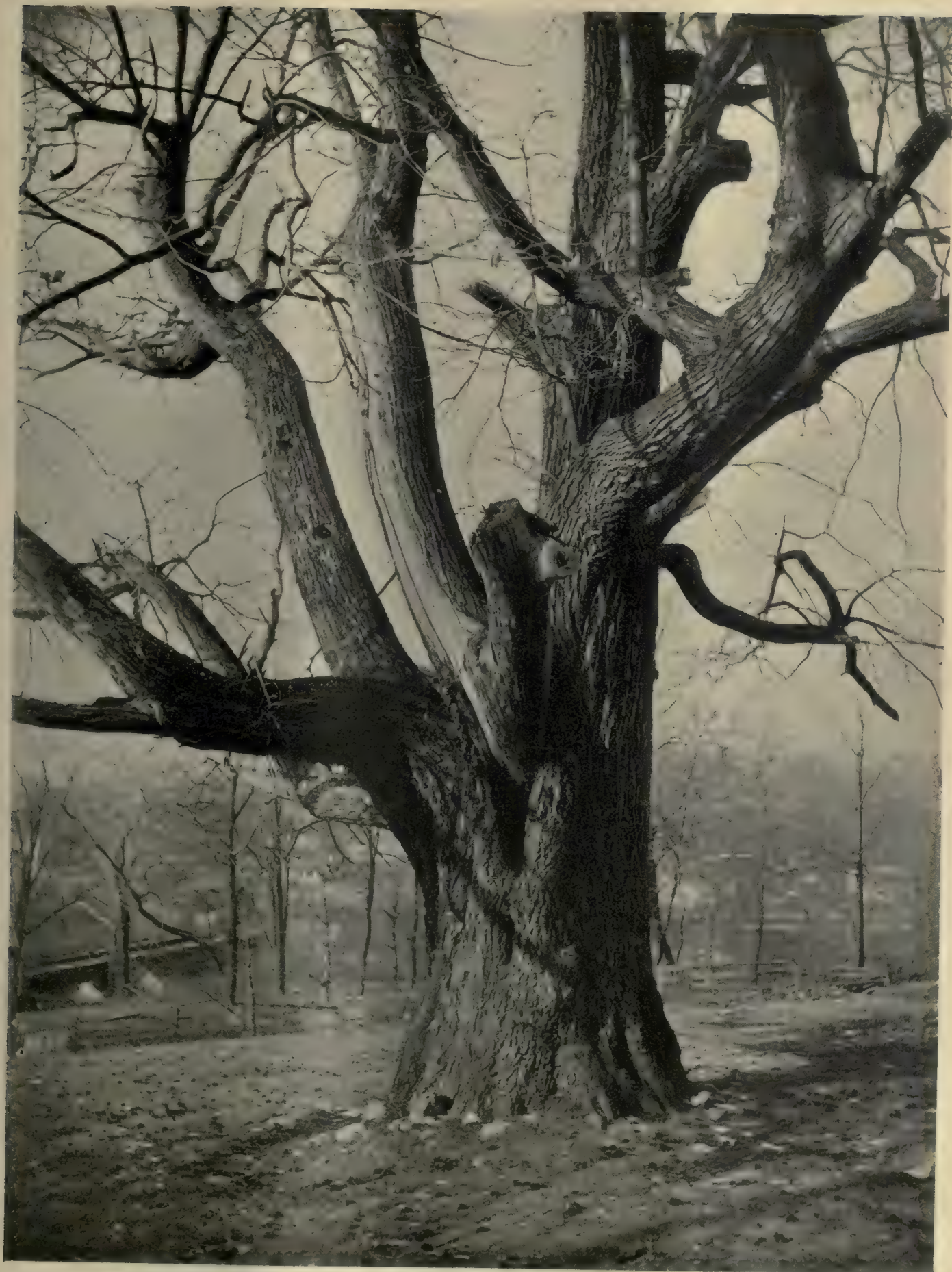


Fig. 12.—The Dauphin Chestnut.—See page 114.

of our Susquehanna scenery will be looked upon as something besides an obstacle in the way of railway enterprise, and receive full appreciation of its hygienic and æsthetic value.

Ann Arbor, Mich.

M. L. Dock.

Cultural Department.

Hardy Shrubs for Winter Flowering in the Greenhouse.

WHERE large quantities and a variety of flowers are needed, either for cutting or greenhouse decoration, many of the early-flowering shrubs are invaluable. But to flower these successfully, most of them need to be specially prepared for the purpose. We lift ours from the borders in the spring previous, selecting healthy, shapely specimens, and put them in pots or neat tubs. Any long or straggling roots are cut back, so that a ball of good fibrous roots may be made. The pots should then be plunged in ashes or other light material to protect them from the hot, drying winds of summer. The shrubs must not be shaded, but exposed to full sunlight in order to get well-ripened wood. Due attention must also be paid to watering. Toward the end of November or beginning of December we place them in a deep frame, admitting air on all fine days. About January 1st we bring into the greenhouse, where they are to flower, about one-third of the whole number. About the 15th of January the next lot is brought in and the remainder about February 1st. A succession of bloom through February, March and April is thus provided for. The greenhouse is kept at a temperature of fifty degrees at night, with a rise of fifteen degrees by day. A list of the hardy shrubs I have found excellent for this purpose includes *Forsythia suspensa*, every branch being loaded with its beautiful golden bells; *Spiræa Thunbergii*, *S. Van Houttei*, *Deutzia gracilis* and *D. scabra*, *Amelanchier Canadensis*, *Pyrus baccata* and *P. Japonica*, *Berberis Aquifolium*, *Prunus Cerasus*, *P. Sinensis* and *P. Persica*, *Xanthorrhiza apiifolia*, *Syringa Persica*, *Ligustrum lucidum*; var. *coriaceum*, and *Daphne Cneorum*.

These should all be potted in the spring. The following may be lifted in the fall, taking care to choose those plants well set with buds: *Rhododendrons*, both the evergreen and deciduous kinds; *Andromeda Japonica* and *A. floribunda*, *Erica Tetralix*, *Vaccinium vacillans* and *Leucothœ Catesbæi*. Of this last named we have some good plants in five-inch pots along the front edge of the stage, and their dark shining leaves with racemes of cream-colored flowers, sessile in the axils, have a particularly pleasing effect. *Daphne Cneorum*, with its rosy pink, sweet-scented flowers, is also useful for the front edges of the stage.

Many other shrubs besides those I have enumerated might be used for this purpose, and we intend to try a greater variety this coming season.

After the shrubs have finished flowering we repot them, removing as much as possible of the old soil and filling in with good rich soil. They are kept in the greenhouse until spring is well advanced, when they are gradually inured to the outside and again placed in their summer quarters. I ought, perhaps, to have mentioned that where these shrubs are flowered principally for cutting, it would be necessary to pot up fresh plants each spring, and those that have flowered, instead of being repotted, should be planted out for a year or two.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Imantophyllums.

BOTANICALLY, *Imantophyllums* are *Clivias*, and all cultivated kinds, according to competent authority, should be classed as varieties of *Clivia nobilis*. For gardening purposes they are distinct enough, and may be continued under the better-known name, which was given to them as descriptive of their long leathery leaves. Their characteristics are a root-stock reduced almost to a crown, shortly stoloniferous above the ground and hidden by the sheathing bases of the leaves. These are two inches wide, from two to two and a half feet long, and distichously arranged. Apparently from the centre, but slightly along one side, rises a stout umbellate scape about eighteen inches long, bearing from twelve to twenty-six tubular orange-colored flowers. In *Imantophyllum miniatum*, which is the handsomest and best known of the earlier introductions, the petals and sepals are nearly equal in size and spreading. The flowers measure between two and three inches across and are as wide as deep. In *I. cyrtanthiflorum* the sepals are much shorter than the petals, which are about two

and a half inches long. The flowers are pendulous, tubular, and scarcely half as wide as they are long, but they are brighter and more lustrous; the lower half of the petals is white, making a pretty contrast.

It is evident that nearly all the forms we now have are crosses between these two kinds. They can scarcely be called hybrids, as competent authorities declare only one species exists. Few of them are worthy the names bestowed upon them. Some are remarkable for vigor, with little or no compensating increase in size, form or coloring. Few have varied much from the type of *I. miniatum*, or are superior from a decorative point of view. August Van Geert and Williamsii are the best known of these so-called hybrids. The object of the raisers of new varieties, no doubt, has been to get the good coloring of *I. cyrtanthiflorum* infused into seedlings from *I. miniatum*, retaining the erect, spreading flowers of the latter. Mr. Harris, gardener to H. H. Hunnewell, Esq., states that out of forty or more seedlings raised by him none departed from the *I. miniatum* type. Mr. Harris called my attention a few days ago to one of the finest varieties either of us had ever seen. Every good quality of *I. miniatum* was evident, with the good coloring of *I. cyrtanthiflorum*. The upper half of the segments is glowing orange-scarlet, and under sunlight quite lustrous, while the lower half, forming, as it were, a throat (for the segments are distinct, though touching), is white. The filaments and anthers are yellow. This variety was sent to Mr. Hunnewell by James Veitch & Sons, London, as number thirty-three. Mr. A. H. Fewkes, of Newton Highlands, Massachusetts, exhibited a handsome variety a few years ago at Horticultural Hall, Boston. It is a handsome kind and similar to number thirty-three. The flowers are equally as large and the coloring quite as good, but in form it is not quite as well finished.

It is practicable in the United States to bloom *Imantophyllums* twice in a season. Those in bloom now can be forced into growth in a moderate temperature, stimulated with liquid-manure, and be ready to be placed out-of-doors in June in shady quarters, with less water, to ripen. They can be forced again in September or October. A full sun treatment has been recommended, but has not proved satisfactory with us. The leaves easily burn, even in winter, and as they are remarkably persistent and produced only at intervals, such disfigurement remains for a year or more.

Wellesley, Mass.

T. D. Hatfield.

Acanthus mollis.

THIS plant is now in flower in the cool temperate house, and though, perhaps, it might not be called pretty, it is stately. It is, properly speaking, an herbaceous plant, and not hardy in this climate, its native home being Italy. The flowers are arranged decussately on the spike. I counted thirty-four flowers and buds on one side. *Acanthus mollis* is the plant in which Goethe first observed the dissemination of seeds by projection when on a visit to Italy. *A. mollis latifolius* is also in flower now, and of the two this is much more robust. The leaves are large and handsome and of a deep shining green. They are heart-shaped, deeply and regularly incised and toothed; like those of *A. mollis*, they are all radical, and as beautiful as Palm leaves. This variety is a native of Portugal and is also known under the name of *A. Lusitanicus*. From the leaves of this plant architects have chosen their models. Its bold and graceful appearance makes it a good subject for an isolated position in the garden or lawn. Two conditions are absolutely necessary—a deep rich soil, and, like most plants with a large amount of respiratory surface, a good supply of water. In England these plants and also *A. longifolius* are used largely in rock gardens. The imposing effect produced by their use in the rock garden at Kew, in a prominent position, is impressed on my mind. They are propagated by seeds and by division of the roots.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Succulent Plants.

AN unusually attractive show of succulents now quite fills a small house in the Missouri Botanic Gardens, and one or two species appealed to me in a new way for supplying cut flowers and winter-blooming house plants. A mass of *Cotyledon (Echeveria) metallica*, with flower-stalks three feet high, was strikingly ornamental, and this would make an attractive plant for a small conservatory or the window-garden, where these can be easily grown. And nothing could be prettier for bouquets than large panicles of the delicate white and rose flowers of *Crassula quadrifida*. They last almost indefinitely when

cut, and their character fits them to replace such flowers as the tiny blue *Statice* and the lace-like *Gypsophila paniculata*, which are invaluable for furnishing the misty, delicate veil indispensable to good flower arrangement. Besides these two succulents, others in bloom were *Kalanchoe crenata*, *Mesembryanthemum heterophyllum*, *Cotyledon clavifolia*, *C. pachyphytum* and another *Cotyledon* that was unnamed and seemed to be between *C. stolonifera* and *C. retusa*, *C. strictiflora*, *C. agavoides*, *Aloe variegata*, which is highly decorative when in flower, and *A. macrocarpa* in bud.

Among many fine species in this very complete collection the rare *Aloe elegans*, *A. umbellatum* and *A. brachystachys*, var. minor, with spines scattered all over the under side of the leaves, were noted. A pleasing feature of this unexpectedly satisfying house was the *Nasturtiums* trained along the rafters on the southern side, all in full flower. They seemed a happy choice, having themselves a succulent look, and they were sufficiently removed from the plants beneath to prevent an unpleasant contrast between the blue-green tone prevailing here and the less agreeable yellow-green of their own foliage. With varieties of *Nasturtiums* having blue-green leaves the effect would have been perfect.

Brighton, Ill.

Fanny Copley Seavey.

The Sundews.

A COLLECTION of *Droseras*, carefully grown, are not only highly interesting on account of their carnivorous habits, but they are beautiful plants to look at. The kinds most frequently seen in our greenhouses are principally natives of the northern hemisphere; these, while very showy, cannot compare in beauty with some of the species from the Cape of Good Hope, New Zealand and Australia. The leaves of all the species are closely covered with glandular hairs, the apices of which, while the leaves are in a healthy state, are continually covered with a thick fluid which serves as a kind of tanglefoot to gnats and mosquitoes. This fluid is liable to become dried up during the heat of the day if the plants are exposed to the hot burning sun, but next morning they are as heavily coated as before. If kept in an open place, where the insects have free access to the foliage, it becomes unsightly in a short period from the enormous numbers of insects entrapped; these insects are conveyed by the sensitive hairs to the middle of the leaf, in which position they are left to decay.

Drosera dichotoma, under favorable conditions, will grow over a foot high. It is the handsomest of all the Sundews, a well-furnished plant making a gorgeous display, owing to the reflected glitter from the innumerable little globules of fluid, especially when the plants are under the electric light. There is an allied form, whether or not a distinct species I am unable to say, which has leaves divided into two primary lobes, and these again into four. It is a stronger grower than the above, with the leaves not so highly colored. Both of these plants are propagated by the roots cut up into small pieces, covered with chopped sphagnum and placed in heat where they will sprout in a few weeks. *D. Capensis* is one of the showiest of the species in which the leaves are arranged in the form of rosettes. This plant has quite a stout stem above ground, and as it persists in sending out one or more thick strong roots from this stem yearly it must be lowered in the pot as the stem elongates. *D. spatulata* forms a very showy rosette of leaves. It keeps quite dwarf; in fact, it grows almost level with the material in which it is potted. All through the summer and late into the fall the hairs are bright red in color. If kept in too hot a place they will turn green. This kind is easily raised from seed, of which each plant bears annually an abundant supply. The flowers are pink, arranged at the ends of very long stems. A good way to grow this species is to pot the seedlings into thumb-pots, using very porous soil. After they have made a few leaves they should be top-dressed with live sphagnum and a number of them plunged in a large seed pan, with gravel between the pots, and the whole finished off with moss.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Cuphea strigulosa.—This is one of an attractive genus, popularly represented by the Cigar-plant, *Cuphea platycentra*. All the cultivated kinds are natives of the New World, the majority belonging to Mexico. *C. strigulosa* comes from the Andes. It forms an attractive little bush and is an interesting addition to winter-blooming greenhouse plants. Our plants were raised from seed sown last spring and planted out for the summer. The plants grew about one foot high. The branches are wiry and clothed with opposite shortly petioled, ovate leaves about an inch long. Curiously, the leaves become alternate from the point

where the flowers appear. The flowers are orange-red, pendulous, in short panicle cymes, and, though never in profusion, continue all winter long. The showy part of the flower is the tubular, spurred calyx. It is slightly labiate, with a curved, pouch-like lower lip, from which an uneven lot, or bundle, of purplish filaments and anthers protrude with pleasing effect. The petals in some species of *Cuphea* are abortive, or reduced to mere points. In the species under notice they are represented by two short maroon-colored limb-like appendages, which look like the standards of a papilionaceous flower. Cuttings root easily, and, no doubt, the plant will prove useful for outdoor decoration.

Wellesley, Mass.

T. D. Hatfield.

Correspondence.

A Home Acre in Southern California.

To the Editor of GARDEN AND FOREST:

Sir,—It would, perhaps, be interesting to eastern readers to know how we treated the acre of land which constitutes our home grounds. We bought this little tract in South Pasadena, California, twenty-one months ago, being attracted to it by the great Live Oaks on and about it, trees that were not started in tin cans and set out with geometrical precision, but specimens which grew from chance acorns dropped fifty or a hundred years ago. Four of these great Oaks, standing just where they ought to be, give our place its name of "Four Oaks." One of these trees is especially dear to the family Druids for having mistletoe upon it. On the border of these Oaks, and partly in their summer shade, stands our comfortable dwelling-house.

As late as the middle of April we began tree-planting, there being only one late Peach and three large Apricot trees on the acre, beside a little leafless tree some three feet high, which we could not then identify. We set out twelve budded Orange-trees, four Lemon, four Olive, a Grape-fruit and a Citron-tree, fifteen deciduous fruit-trees, a hedge of Blackberry and Raspberry plants, a large bed of Strawberries, four Guava bushes and eight Grapevines, and laid out a general kitchen garden, including a large herb bed.

The returns of the first year were something marvelous. The Strawberries bloomed a little and fruited; the red Raspberries bloomed freely and surprised us with much fruit; the Blackberries fruited quite a little in the fall and winter. The next spring the deciduous fruit-trees, after being pruned, were three and four feet across and became white with bloom, and eight to ten fruits were allowed to set and ripen on each of the Peach-trees. The Orange and Lemon trees bloomed freely, and six to twelve oranges were left to set and ripen on two Washington Navel-trees. The Olive-trees are eight and ten feet high.

The Strawberry bed proved a failure when winter rains set in, as the crowns were set too low and rotted. Subsequently plants were set in slightly elevated rows, and in four weeks one single stem bore forty-eight berries, and many stems held up twenty-five. The fruiting of the Grapevines in their second year, seventeen months from planting, surprised us also. From two Muscat vines we gathered fully two pecks of fruit. The Mission vines did nearly as well, and all of them bore a little fruit. We give our vines long pruning to grow them over a trellis for want of room to grow them in bush form, as is common in California. In limited grounds the vines are trained over a trellis and the arbor in turn becomes useful as a substitute for a lath-house. In our climate, where the atmosphere is so dry, a great many plants require lath-house protection, and space must be spared for this shelter. The Strawberry Guavas fruited heavily during the second autumn after their planting.

In the ornamental grounds a Loquat-tree has not yet fruited, but has increased its size threefold since planting, and a Russian Mulberry-tree, forty feet high, has developed from the leafless and unknown wither, three feet high, when we bought the acre. It fruited heavily, but its fruit is so much coveted by the many beautiful birds that we did not try to harvest any. Other trees thriving are a *Persea gratissima* (Alligator Pear), an *Aralia papyrifera* (Chinese Paper-tree), a *Eugenia Mitchellii* (Surinam Cherry), a *Camphora officinarum* (Camphor-tree), a *Jacaranda mimosifolia*, a *Eucalyptus ficifolia* (Red-flowering Eucalyptus), and a *Ceratonia Siliqua* (St. John's Bread-tree).

In anticipation of ripe fruit the year around, we have planted Orange and Lemon trees. These fruits are always on the tree ready for use, if allowed to remain, the old fruit getting a little dry before the new is fully ripe. We have early peaches and apricots to ripen in June, and some later varieties. One peach (Pickwick Late) ripens in the latter part of November. Necta-

ries ripen in July, and many Plums. Our Plum-trees include Kelsey Japan, Burbank and French Prune; a Birtlett Pear-tree ripens fruit in August. Strawberries can be kept in fruit the year around. Blackberries come into fruit as early as latter April, and continue until the middle of December. There were green leaves and a little bloom scattered through the row during all of last year. Red Raspberries bear two crops, the first fruit coming the latter part of April, and the second bloom starting in September, making a continuous crop, with lessened vigor in August, until January. There have been scattered bunches of delicious fruit on our row during the entire year of 1895. Black Raspberries do not thrive here; they are very dry, and we were disappointed in our one plant. Our early Grapes came into fruit in August, not as early as our neighbors', and the late varieties lasted into December.

A high wire fence was arranged about the Citrus orchard, and a flock of Plymouth Rock fowls housed there. Four movable hen-houses are located wherever fertilizer is needed, and the orchard is cultivated every month.

In our vegetable garden a pretty effect is produced by a long row of Swiss Chard next to the dark green Alfalfa. We plant Lima Beans in March, and they bear prolifically until the latter part of July, when they rest some four or six weeks, and in September come up anew from the same roots, and bear quite as well until the slight frosts about New Year's. Spring Squash-vines cut off in August will become green at once and bear a second crop, as will also Melon-vines. We plant Peas in September and October for winter use, and in February for summer use, the frost not being heavy enough to damage them. Tomato-plants may be kept over, and do well the second year. Onion and herb seeds are planted in October. The herb-bed contains Sage, Peppermint, Thyme, Dill, Summer Savory, Sweet Marjoram, Lavender, Borage and Caraway, and, with the exception of Dill, Summer Savory and Caraway, these are green the year through. We have a bed of large and small Chilis and Lettuce during all the year. Lettuce is sown in a seed-bed, and some of it is always ready to transplant. A plant transplanted in February, with bottom-heat, will more than cover the largest dinner-plate by the last of March. Asparagus is ready for use in February, and the second year our bed furnished large fine shoots into June.

We have about fifty varieties of Roses, which bloom the year around, the flowers being most perfect from March to June or July. Grass is very tedious to grow in southern California, the least bit of shade from a shrub turning it yellow. We have no grass because our front yard is shaded by the Oaks, but we cultivate Violet-lawns instead—one of Swanley (white), one of Czar and one of Giant California. The lawn of Czar Violets gives bloom the year around, and all are green. We have besides other Violet plots. Our row of Freesias is in luxuriant bloom from February until May. Chrysanthemums flower from September to January, and can be coaxed to bloom on into March.

Our Palms are small now, but thrifty. Two plants of *Phoenix reclinata*, set out soon after our arrival, are six and eight feet across; they are in the open ground. Our Kentias are potted and kept in sheltered places from wind; we have *Kentia Fosteriana*, *K. Belmoreana* and *K. Canterburyana*; also a *Seaforthia elegans*, potted. A *Washingtonia filifera* and *W. sonora* are thriving in the open, and so are plants of *Erythea armata* and *E. edulis*. Under one Oak is a rockery to make an exposure for Ferns, and here seven of the native sorts are doubling the size of wild ones. But a tale of the rockery flowers would make a book.

Outside of the labor of watering, a gardener can keep one acre in fine shape by doing two days' work each week, after the kitchen garden is planted. Watering is an item in this land of perpetual summer, with rain in only four months of the year, and is a daily necessity at twilight in many parts of the garden. To one who delights in this kind of a playground, considering that the skies in daylight are blue and cloudless eight months in the year, with never a horrible thunder-shower, the labor with hose and spray is not a heavy exercise.

Lincoln Park, Calif.

Jennie Kruckeberg.

The Aspidistra Scale in California.

To the Editor of GARDEN AND FOREST:

Sir,—In 1869 Signoret described *Chionaspis aspidistræ*, found on *Aspidistra* in cultivation in Europe. Maskell in 1891 reported the species from *Areca Catechu* in India. Mr. E. E. Green (in litt.) has detected a variety of it in Ceylon, and has been so good as to send me specimens. This Ceylon form is found on *Mussaenda frondosa*. Finally, Mr. Craw has found

the species on leaves of *Aspidistra lurida*, from Japan, examined in the course of his quarantine work.

It was believed that the insect had not effected a landing on our shores, but now Mr. S. A. Pease, Horticultural Commissioner for San Bernardino County, California, sends me some, mixed with *Aspidistis ficus*, on *Aspidistra*, from San Bernardino. So long as this scale is confined to ornamental plants in hot-houses or gardens it is, perhaps, to be considered as of comparatively small importance; but a form found by Takahashi on Orange, at Tokio, Japan, is extremely close to it, and may even be specifically identical. This latter, which I have named *Chionaspis latus*, seems to me to be a valid species, but Mr. Hubbard, of the Department of Agriculture, for whose opinion I have great respect, believes that there is only one species concerned. Should his view be correct, we must regard *C. aspidistræ* as rather a dangerous scale. The male scales of these insects are white and tricarinate; the female scales mytiliform, reddish brown. That of *C. latus* is much broader than that of *C. aspidistræ*, but individuals of the latter are sometimes quite broad, though not so broad as *C. latus*.

According to Mr. Pease, this *Chionaspis* was brought from Japan to San Francisco two years ago on plants which were fumigated, and then sent from there to Redlands. The original plants were used there for propagation after having been dipped in kerosene emulsion to insure disinfection. The scale must, nevertheless, have come from the original stock, and this well illustrates the necessity for destroying, not merely fumigating, imported plants infested by exotic scale insects.

New Mexico Agricultural Experiment Station.

T. D. A. Cockerell.

The Forest.

Forest Protection.*—III.

"DURING the present century," says Professor Hartig, in his *Diseases of Trees*, "and especially during the last few decades, the forests of Germany have been threatened with dangers of a magnitude formerly unknown. These have been occasioned by the gradual relinquishment of natural regeneration, and by the substitution of pure even-aged woods for woods consisting of trees of different species and of various ages, but most of all by the displacement of broad-leaved trees by pure coniferous woods. It is especially noticeable that enemies from the animal and vegetable kingdoms find favorable conditions for rapid development in our modern forests, so that the complaints of increasing devastation of woods appear to be by no means unfounded."

Of late years a vigorous reaction against the former methods of forest management has been taking place in Germany under the leadership of Karl Gayer, Professor of Forestry in the University of Munich. Among the reasons urged, the greater safety of mixed forests against the attacks of both insects and fungi is conspicuous. The danger of devastation from each of these sources is great in pure forests, especially if they are composed of coniferous trees.

The attacks of fungi never reach the extensiveness of insect depredations, a most fortunate circumstance, since the means of resisting them are almost entirely indirect, and very inefficient at the best. Such remedies as exist are prophylactic and disinfectant, and the most important of them is to avoid woods of a single species and to keep the forest in general good health. Measures against insects, on the contrary, are often direct and effective, where the relatively heavy expense can be borne. I may add that owing to a copyist's error the destructiveness of insect pests was not treated in my last paper with the emphasis which it abundantly justifies.

Among the conspicuous American fungi closely allied to the European species described in the volume under discussion are those of the genus *Æcidium*, to which the Witches'-brooms and other excrescences on various species of American Firs and Pines are due. *Polyporus sulphureus*, a fungus destructive to the Oak in Europe, also attacks

* *A Manual of Forestry*, by Dr. W. Schlich, C.I.E. Vol. iv., Forest Protection, by W. R. Fisher, B.A. London: Bradbury, Agnew & Co.

Oaks in the United States, and other species of the genus have been noted in this country by Dr. Mayr. The White Pine and several of the conifers of the Pacific slope suffer from injuries inflicted by members of the genus *Trametes*. In Europe, *T. radiciperda* is the parasitical fungus most dangerous to coniferous woods, of which it destroys the roots and the lower part of the stem.

In discussing means of protection against fungal disease, Professor Hartig says: "The best prophylactic measure against the occurrence and spread of an epidemic is the formation of mixed woods. Infection, both below and above ground, is least likely to occur when every tree is isolated by being surrounded by others of a different species. On ground which is infested by root-parasites, or which contains resting-spores whose vitality is preserved for many years, it may be advisable, under certain circumstances, to abandon the cultivation of some particular species of tree."

It may fairly be asked how these matters bear upon the forest questions that confront us here. Their value, to my mind, lies very largely in the emphasis they give to the good qualities of mixed forests. If we must plant forests, a remote contingency east of the Mississippi, but an immediate necessity in many places west of it, the question of what kind of forests requires an answer. To specify the kinds of trees is by no means a solution of the problem.

Mr. Fisher's discussion of the injury done by frost is unfortunately not clear; nor has he improved upon the usefulness of Dr. Hess's description, although he has brought to the subject the results of more recent investigations. A statement of the action of frost upon the tissues of plants, on the points of which both Hartig and Prantl agree, is somewhat as follows:

As the temperature of a plant descends pure water is separated from the cell-sap and withdrawn from the interior of the cells, which lose their turgescence. (Turgescence in a plant cell occurs when the cell is sufficiently supplied with water. It is the prerequisite of growth.) The concentrated sap remains in the interior of the cells, while the water freezes in the intercellular spaces outside of them. Rapid thawing, to which the major part of all injury from freezing is due, does harm because it allows insufficient time for the reabsorption of the water through the cell-walls. Consequently it either remains between the cells, where it stagnates and eventually discolors the plant and causes its decay, or it evaporates and the plant dries up. In either case the cells lose water. On the other hand, if the amount of water withdrawn from the cells is small, or if the thawing is sufficiently slow to allow reabsorption, the plant recovers. It is in this deficiency of water in the cells that the harm done to green vegetation by freezing always lies. In frozen wood, since for the most part intercellular spaces do not occur in woody tissues, the water separates from the sap and freezes inside of the cell. The effect of severe frost may be noted in the narrower annual rings found during the years when it occurs.

Rime or hoar-frost is a very dangerous enemy to trees of all ages. The damage done by ice-storms is at times most incredible. In the southern Alleghanies I have seen trees six or eight inches in diameter broken off short, and in many places the ground so littered with branches torn off by the weight of ice that progress on foot was a difficult matter. Snow is far less harmful to old trees than rime, while hail does serious damage only to the very young.

The process by which frost lifts young seedlings from the ground is somewhat as follows: When the moisture in the surface soil freezes it expands, rises and carries with it the young roots of the seedlings imbedded in it. As the ground sinks back to its original level when the thaw comes, the numerous fibres of the roots cannot drop back into the holes from which they were drawn, and the seedling remains at the height to which it was raised by the freezing. A repetition of this process finally lifts it so far above the ground that the roots lose their hold upon it and

the young tree falls over. This may be one of the most extensive causes of damage in nurseries, where the process of replanting often becomes extremely expensive. To guard against the evil effects of low temperature and storms many ingenious protective rules are laid down, but they need not be quoted here.

A curious form of damage to young growth mentioned by Mr. Fisher is from heat reflected by the trunks of old trees standing among seedlings in early youth. I have noticed similar damage in the vicinity of trees with large shining leaves, such as the Balsam Poplar. Such facts supply still another reason, where there are already so many, for keeping the leaf-canopy uninterrupted in the forest.

The matter of protection against winds, except in so far as it regards the planting of wind-breaks, and, perhaps, occasionally the maintenance of unbroken forests on the summits of hills, has very little application in the United States at present. The means taken to guard against it nearly all require for their execution a degree of refinement in methods which is still many years in the future. The danger and injury are here, but the remedies are out of reach.

The chapter on forest fires contains much interesting material from Indian experience, especially as regards measures of protection. It is more nearly adapted to the question of fires in the United States than any other similar treatment which I have seen. Indeed, Indian experience in this matter resembles that of the United States, at least in the enormous areas devastated and the enormous interests to which the fire is destructive. As a striking instance of the divergence in the European and American points of view and scope of experience, it is curious to note in a section entitled Register of Fires that the burning of 5,675 acres in the year 1800 in the Black Forest is still thought worthy of record, as well as that of 3,300 acres in Prussia in 1857, and of 3,250 acres on the Lüneburg Heath in 1880. On the other hand, our own fires of 1881 and 1894 are also mentioned, and the great destruction in Canada in the year 1863.

In happy contrast again is the statement that the average number of fires a year in Prussia from 1860 to 1880 was but twenty-nine, and the average area burned over only 1,335 acres. Here is a condition utterly beyond us at the moment, but for which we may look and work with confident hope. Thirty years ago the attempt at protection against fire was just beginning in British India. Now it is effective over more than 24,000 square miles, and at a cost per square mile of somewhat less than \$3.00 per annum.

One of the subjects which demand most earnest investigation in this country is the natural history of forest fires. Already some material has been gathered, such as an exceedingly interesting paper by Mr. Austin Cary in the report of the Forest Commissioner of the state of Maine for 1894, and certain articles by Mr. H. B. Ayres, of Minnesota; W. W. Ashe, of North Carolina, and John Gifford, of New Jersey; but, on the whole, the vast body of information which must exist in the minds of those who know the forest best has not been adequately formulated, nor have the investigations needed to give accuracy and completeness to such a statement been undertaken. Such a field is far too promising to be long neglected.

In conclusion one sentence must be quoted, for in it lies the gist of the whole matter. Speaking of countries like India, Mr. Fisher says, "More than half the battle against forest fires is won when the protection of the forest from fires meets with sympathy from the neighboring villagers."

New York.

Gifford Pinchot.

Notes.

At the exhibition of flowers at the Farmers' Club in this city a vase of Mr. Fisher's new crimson seedling *Carnation* attracted much attention. This variety commended itself to the experts at the late meeting of the *Carnation Society* for its size, form, fragrance and other good qualities.

Vol. i., No. 1, of a little ten-page monthly entitled *Horticultural*.

ture, and published at Cuyahoga Falls, Ohio, has just come to this office. It is edited by M. Crawford, and it is full of practical instruction on the cultivation of fruits, vegetables and flowers. It costs twenty-five cents a year.

The stormy weather of the past week has made dull trade in the fruit markets, and shipments, too, have been interfered with. Oranges are commanding somewhat better prices, while lemons continue so cheap as to involve heavy losses to importers. About 110,000 boxes of oranges and 320,000 boxes of lemons are now on the way from Mediterranean ports. Coconuts are abundant, some 95,000 having reached this port during last week. The supply of Cape Cod cranberries is becoming small, and some fancy berries have recently sold at wholesale for \$11.50 a barrel.

The vacancy in the Department of Botany at Cornell University, made by the resignation of Professor A. N. Prentiss, has been filled by promoting to his place Mr. George F. Atkinson, who has been Associate Professor. Assistant Professor Rowlee has been promoted to the highest grade of Assistant Professor; Mr. E. J. Durand has been appointed Instructor, and K. M. Wiegand, Assistant. Under the reorganized scheme of study, courses in comparative morphology, mycology and algology are offered by Professor Atkinson and Instructor Durand, and courses in comparative histology, systematic botany and dendrology by Professor Rowlee and Mr. Wiegand.

Mr. F. E. Emory, Agriculturist of the North Carolina Experiment Station, has just issued an interesting circular on hillside terraces—that is, a succession of comparatively level benches arranged on sloping ground to prevent the soil from washing away. All who have seen the unsightly gullies in the rolling lands of the south and who appreciate the enormous loss of plant-food which is washed away every year will recognize the importance of any device which will arrest this waste. The method of constructing these terraces is carefully explained, and the value of the practice has been proved by ten years' experience. It is a misfortune that the bulletin is printed on such poor paper that the illustrations have little value.

The frost which came in California last week after the warm weather did considerable damage to Almonds, Apricots, Cherries and Peaches in Sonoma and other counties, but the fruit prospects in the state generally are said to be unusually bright. In spite of the freezing weather at the end of the year the shipments of oranges from Southern California have paid a better average, perhaps, than ever before. Over 2,400,000 boxes have been shipped eastward, and 800,000 boxes still remain; the price offered has averaged \$3.50 a box, of which the grower gets a clear \$2.00, or \$300 an acre. As it will be some years before Florida can actively compete in this fruit, investments made in Orange groves in Southern California are likely to continue profitable.

Kaffir Corn, one of the so-called non-saccharine Sorghums, has been found to flourish well in Kansas, Oklahoma and Nebraska, where the soil warms up early and where droughts are severe. It might flourish well in the east in dry seasons if it were not planted until the soil was thoroughly warm. Fifty, and even more, bushels of seed have been grown to the acre in Kansas, and frequent tests have shown that the seed is almost equal in feeding value to Indian corn, but it is principally useful as a forage crop. Kaffir Corn, Jerusalem Corn, Milo Maize, Brown Darra are all varieties of this group of Sorghums which are especially useful on account of their drought-resisting qualities; both as forage and for the grain which they produce they have been proved to be more desirable than the so-called saccharine group of Sorghums.

Professor Taft, of the Michigan Agricultural College, says that the Peach growers in that state who have sprayed their trees with the Bordeaux mixture, in order to prevent curled leaf and rot, have found a decrease in the number of their trees attacked by the yellows. Some of these orchards, where the disease had never failed to appear in previous years, have been entirely free from it for two seasons, while its ravages have been continued in surrounding orchards. This does not prove that the disease can be prevented by using fungicides, but since it is known that the yellows is highly contagious and that it probably is spread by germs of some kind, it is possible that trees kept covered with copper sulphate are protected against it. Peach growers who spray their trees just before the buds start in spring, and once or twice after the blossoms fall, will certainly find that this treatment will pay against rot and leaf-curl, even if it fails to arrest the progress of the more dreaded yellows.

In the absence of statistics relating to forestry in this country a circular of facts and figures regarding our forest resources, just issued by Mr. B. E. Fernow, Chief of the Division of Forestry, is an interesting little document. The data given are, of course, only approximations, but they give estimates as far as practicable on such important points as the extent of our forest area, the character of the forest growth in different regions, the amount of timber standing, the annual cut and value of these products, the amount of exports and imports and the extent of losses by fire. This is followed by a brief description of the principal centres of production of the leading commercial timbers, including the White pine, the Red pine, the Bull pine (*Pinus ponderosa*), the Long-leaf pine, the Cuban pine, the Short-leaf pine, the Loblolly pine, spruce and fir, the Douglas spruce, hemlock, Bald cypress, Red cedar, redwood, oak, hickory, ash, poplar, cottonwood and other hard woods.

Not long ago two men were convicted of plundering the lanes of Devonshire, England, of the Ferns which give them such beauty. Five hundredweight of Fern roots were found in their possession as the results of former raids, and it is not difficult to imagine how the banks and hedgerows will be changed in appearance after such wholesale pillage. In speaking of this case *The Gardeners' Magazine* says that if these plants should receive proper care, so as to lighten up the gloom of some city or town room with their foliage, the case would not be so bad. But these raiders select a time when the roots are least likely to survive removal, especially after they have been carelessly stored. These spoils of shady lanes are hawked about for sale, it seems, in open barrows, and are often nothing but rootless crowns, and as they are often baked in the glare of city streets for days together, not one in a thousand will ever survive to make a good specimen. Obviously many buyers are found, however, or the trade would not exist, and yet it is said that very few nurserymen in all the country find it worth while to raise or distribute even the most beautiful varieties which have been developed from the common British Ferns.

Mr. Theodore L. Mead, of Oviedo, Florida, writes an interesting note to the *Orchid Review* on the Vitality of Pollen. He has had success in hybridizing *Laelias* and *Cattleyas* with pollen which had been kept after removal from the flowers for two weeks, and in some cases even more than a month. On other occasions he has failed with pollen that had not been kept so long, and he well says that it would be instructive if other experimenters would state how many good pods they have secured from pollen which has been kept three weeks or more, and especially if they would specify the conditions as to dryness, darkness, ventilation and the like, which seem important in keeping the pollen alive. His own method has been to put the pollen in paper packets, and these are kept in tin boxes. He has found no advantage in enclosing it in gelatine capsules or other almost air-tight coverings. Mr. Mead thinks that the pollen parent has much to do with the length of time required for ripening seed, and gives many examples which show what he considers a tendency toward a mean between the normal time for ripening seed of each parent. It must be admitted, however, that the real cause of the variation of the periods of ripening between crossed and uncrossed capsules has not been satisfactorily determined.

The stock of apples to be depended upon for the remainder of the season is smaller than usual at this time of year, not many more than 100,000 barrels being held in the entire country. Since September 1st about 650,000 barrels have come to this city, 265,000 of which were exported. The *New York Tribune* says that the export trade has been large and fairly profitable, notwithstanding that transatlantic countries, as a rule, had full crops. The foreign apples, however, were mostly early ones, which were mainly consumed before New Year's, so that a good market existed for American apples. London, Liverpool and Glasgow, as usual, were the best markets, and some satisfactory shipments were made to Paris. Not a few apples have come east from Kansas and Missouri, and some choice Pippins are now on the way from Oregon, the fruits separately wrapped in paper and packed in boxes holding a bushel. These are intended for export. Altogether, this season, 750,000 barrels of American apples have been exported, including the Canadian output. As but few more will go abroad, the total foreign shipments will fall short of last year, when 1,438,155 barrels were exported, the largest amount ever sent out of this country in a single season, excepting only 1891-92, when 1,450,336 barrels were sent to foreign markets.

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John Bartram.

THE facts relating to the preservation of John Bartram's garden, detailed on another page of this issue, stand for an expression of civilization which is pregnant with possibilities. John Bartram was a Pennsylvania farmer, possessed of good understanding, remarkable powers of observation, uprightness of character, courage, a strong will and much industry. His love of plants showed him his field for doing good in the world, and made him a traveler and discoverer at a time when no other American was interested in botany. Through his friendship with Franklin he made the acquaintance of many of the most distinguished men of science in Europe, and his correspondence stimulated his activity and increased his usefulness. For many years in the eighteenth century John Bartram was the principal agent for the interchange of plants between North America and Europe, and to his efforts can be traced the introduction of many American trees into the gardens of Europe, and the planting in this country for the first time of several of the inhabitants of Old World forests. The first garden established in America for the study of plants was made by John Bartram; and his example led to the formation of the second American botanical garden, that of his cousin, Humphry Marshall, the author of the first book on American trees written by an American and published in America. John Bartram's reputation as a botanist, his admirable character and willingness to impart the information he had gathered in his long journeys, and the fame of his garden, made his home by the Schuylkill the Mecca of plant-lovers in America and gave scientific importance to Philadelphia.

John Bartram's garden, judged by the standard of our day, was a very humble one, and the plants which it contained are now all perfectly familiar to us, but, in his time, they were familiar to no one, and had been gathered slowly and laboriously at the cost of dangers and hardships which we cannot now even picture to ourselves. The city of Philadelphia might have selected within its boundaries some other site which would have been more desirable in location and natural features for a park, but in honoring the memory of John Bartram in this manner it

has done something which is of far-reaching significance. As a people we preserve and sometimes even attempt to embellish places of historic interest, buildings which are famous on account of the events which have taken place within their walls, and objects which appeal to our patriotism—the old State House in Boston, Mount Vernon, the headquarters of Washington at Newburg, the Liberty Bell and battlefields of the War of Secession; but this is the first time in this country that the memory of a man who served his country by going into the forest and gathering trees and seeds and making them grow, and then sharing his discoveries with others, has been honored with a memorial like this, which will keep Bartram's virtues and his services in the minds of men as long as Philadelphia continues to be a city.

This Bartram memorial seems to us to mean a great deal, to be full of hopefulness for the future of this country; to mean that the whole science of rural life and the love of fields and forests is really to be a part of our national life. And, if this is true, it is the evidence that men and women are going to turn to the soil for rest and recreation; that the love of Nature and of growing things, which the Bartram memorial stands for, will gradually so enlarge and broaden us that life in this country will be fuller and better and more beautiful than it has been in the past; that public sentiment, stimulated by the love and knowledge of Nature, will make it possible to preserve our forests from ruin, to maintain urban parks safe from the inroads of greed and ignorance, to prevent the destruction of beautiful scenery, and to make this wide land fruitful and attractive for all time. John Bartram served his country well in his own generation, but his life in the influence it can now be made to exert has a power for usefulness which neither he nor any of his generation could have imagined.

LAST week we spoke of certain dangers which threatened the forest reservations in the wild mountain regions of the west, but it would be a mistake to suppose that land which is set apart for public use in the older-settled portions of the country is any more safe than it is in Oregon. A plan is now on foot to take the Niagara Reservation out of the control of the Board which has managed it so wisely, and the meaning of this seems to be that certain capitalists are anxious to obtain franchises so that they can speculate on the Falls as a water-power. Even if the people were suffering because this mighty force was running to waste, that would be no reason for giving it away to any private corporation. But, so far as we can see, there is no mechanical or material necessity for destroying the grandeur and sublimity of the great cataract which is recognized as one of the wonders of the world. Its uplifting influence on the minds and imaginations of thousands of visitors certainly ought to count for something. A spectacle which enlarges and educates the mind, and opens it to noble thoughts, may be as truly a potent force in a civilized community as the electricity which the plunging river may be made to generate. We apprehend that the enlightened people of the state and of the country would feel the obliteration of Niagara as a distinct and personal loss, even if every ounce of its force were utilized to run some machine to provide for man's material wants. A community which erects immense advertising boards, to shut out or mar some refreshing prospect, and allows objects of great natural beauty to be desecrated, is plainly on the road to savagery. It certainly is no evidence of thrift or progress in its highest sense that we are willing to sacrifice all the higher emotions of our nature for purely material results. It is not an evidence of civilization that we permit the banks of our great rivers to be scarred by cuts and fills in constructing railroads, when they could have been built equally well without such an offensive exhibition. It ought to be a matter of more than local concern that the rugged battlements of the Palisades are being blasted down for paving blocks and building stones. And yet a member of Con-

gress or of the State Legislature hesitates before he introduces or votes for a bill which is simply to protect natural scenery for his own sake. He seems so fearful of being sneered at as sentimental or unpractical, that he is compelled to manufacture some excuse for doing what is plainly dictated by enlightened public policy. Before any provision can be made for protecting the Palisades, Congressmen have to be assured that they have a military or strategic importance, which, no doubt, is true. It ought to be enough for the country to know that this wall of rock is the most dignified natural spectacle near the chief maritime city of the continent. A people, entrusted with a possession like this, deserve to be stigmatized as vandals

that he bought land on the west bank of the Schuylkill and built the main portion of his house (see pp. 122 and 123), and it is the second wife's name that appears on the panel in the south gable, "John and Ann Bartram, 1731."

The land lay along a beautiful reach of the Schuylkill, between Gray's Ferry and Point Breeze; the greater portion was rolling, other portions were marshy, but Bartram irrigated, drained and improved these swampy reaches, adding more land, until he possessed upward of six hundred acres. After his death this was divided and subdivided, but throughout all changes and divisions the greater portion of the Garden remained intact, and was owned by those who were either attached to it, or interested in it, so



Fig. 13.—John Bartram's House—east front.

if they do not transmit it unimpaired as a secure inheritance to their children.

It cost years of effort to wake the people up to the point of organizing some protection for Niagara; certainly there ought to be enough public virtue left in the state to restrain the Legislature from facing about to undo one of the best pieces of work ever accomplished.

Bartram's Garden To-day.

THE near approach of the two hundredth anniversary of John Bartram's birth should arouse a widespread interest in the work now in progress at his Garden, under the auspices of the University of Pennsylvania.

John Bartram was born at Darby, Pennsylvania, on March 23d, 1699; he received his early education in that vicinity, where his body now lies. He was twice married, and it was about the time of his second marriage, in 1728,

that in its life of more than a century and a half it has suffered less change than any other portion of the estate.

The original Garden comprised about five acres, beginning on the higher ground, a short distance west of the house, and extended beyond it toward the river. All of this land is included in the tract of about twelve acres, purchased some five years ago from the Eastwick estate by the city of Philadelphia. The city now owns, but has not yet taken possession of, land adjoining on the north, and it hopes shortly to acquire more of the Eastwick property adjoining on the south. The acquisition of the Bartram property, through the instrumentality of Mr. Thomas Meehan, the press, and the generosity of public-spirited persons throughout the country, is generally known. From time to time articles have appeared in the Philadelphia papers reflecting on the management. Many of these displayed a complete misunderstanding of the character of the place and its requirements, and most of them an ignorance of

affairs, legal and financial, which needed consideration. It has seemed curious that in Philadelphia so little general interest has been shown in this unique place, for there are some repairs which should have been made earlier if means had been available. But, on the whole, delay has not been a misfortune, for it has given those best fitted for the work time and opportunity to formulate plans whose value will become apparent with time.

Suggestions for "beautifying" have been made, the very thing to avoid, for it would destroy the air of antiquity which pervades the place, and which even the suburban squalor apparent in some portions cannot destroy. One

far as present conditions permit, of restoring the house and grounds to original conditions. In labeling specimens the historic ones will have brief histories attached, in addition to botanical and popular names. Apart from association, the buildings are well worthy of preservation as examples of the constructive methods of the first half of the eighteenth century. They stand about midway in the grounds, where the higher portion ends and the slope to the Schuylkill begins, and are reached, as in Bartram's time, by a private lane that runs in from Darby Road, and which is bordered by forest trees, among them some beautiful Willow Oaks.

The lane skirts the upper part of the orchard where



Fig 14—John Bartram's House—west front.

enthusiast on the subject of beautifying shed abroad some quaint and curious botanical information. After stating that "the wild growth of underbrush has choked the rare shrubs that still survive, and none of these plants is still labeled so that the visitor may identify them," went on to describe one of the trees (Mossy Cup Oak, *Quercus macrocarpa*) as "a huge and spreading Oak which bears acorns with a fringed cup, the like of which no one to-day has ever seen, and whose original habitat is unknown." Besides this, there were "varieties of the British *Æsculus*, American Horsechestnut, Buckeye, Cottonwood, and several supposed to belong to the tropics, such as the *Magnolia*, *Cypress* and *Chinquapin Oak*." Glib ignorance of this sort will, it is hoped, be dispelled by the educational work, admirably planned by the University authorities, to follow their present practical work of retracing paths and boundaries, removing dead wood, giving crowded specimens light and air, repairing broken stonework, filling in washed-out places, and, so

Bartram experimented successfully with irrigation. Near a group of White Pines a diverging path runs diagonally from the lane across the orchard, past a fine Yew, and on to the west entrance to the house, where lane and path meet again at the doorway, after having passed through the oldest part of the Garden. Near the house they cross a railroad cut (really a picturesque feature, its rocky walls curtained with herbaceous plants and vines) that marks the site of the old kitchen garden; between this and the house was the flower garden, and portions of the beds are yet outlined by Box borders that were planted about fifty years ago.

The path is, perhaps, rather more attractive than the lane, but those who know their "Letters" will follow the lane. From its entrance into the grounds, across the bridge, past the barns and to the house-door it is like turning the pages of the earlier Collinson letters. First come the "narrow-leaved Oaks" and "noble White Pines";

close by the bridge is "that curious tree from the Jerseys" (Hackberry, *Celtis occidentalis*); near the west door a "Sugar-tree" and Horse-chestnut; the latter, perhaps, the one that Bartram believed to have been the first to blossom in America.

The house is built of heavy gray stone blocks, mortar-covered on the older western part and on the gabled ends. The front, which is of a later date, is built of still heavier blocks, and shows some attempt at ornamentation in the stone window-frames and bases and capitals of the porch columns. Still later, Bartram placed over his study window the panel with its inscription—

Tis God alone Almyty Lord
The Holy One by me adored
John Bartram 1770.

That a great part of the house is the work of Bartram's own hands we know from that letter to Jared Eliot, where he describes his method of quarrying and working stone, and says: "I had been used to split rocks to make steps, door-sills, window-frames, pig and water troughs. I have split rocks seventeen feet long and built four houses of hewn stone, split out of the rock with my own hands."

The woodwork over the porch and stone and brick addition on the south were added in this century. The western doorway was the original entrance, and through it one steps down into the house. The rooms are, with one exception, small, and are floored with the original heavy oak boards. In one of the rooms a cupboard in the wall beside the chimney is shown as the place where Bartram kept his seeds. This is doubtful, when the great quantity he kept on hand is considered, and, in spite of the thickness of the wall, this cupboard must have been a rather warm place.

The little "study" is an indisputable fact; from it one can pass out to the enclosed porch, with its stone floor, and have a good view of the grounds in front. The Box-trees planted about the house are of such enormous size that they interfere with all views, yet one would not have them destroyed. Near the upper corner of the house is the "Thorn" sent by Collinson, and near the south end is the Pear-tree of which Collinson wrote to Bartram almost a century and a half ago, "It has been thy pleasure to wait, but mine to hear of the delicious pear raised from Lady Petre's seed; but she, dear good woman, is gone to rest."

From the house to the river the land falls gradually, but directly in front of the house is a terrace, with remains of a Box-border along its outer edge, where it is upheld by a dry stone retaining-wall, pierced by two narrow flights of steps. From the terrace, paths originally led by circuitous routes through the ground and down to the river; one of them ran near the greenhouse, whose lines are still visible, a short distance from a very beautiful Yellow-wood, *Cladrastis lutea*. Further down, this path runs near the great Cypress, *Taxodium distichum* (see p. 125), brought from Delaware by Bartram, and now nine feet in diameter. Later on this path joins one along the river-bank. It is on this river-path that one finds the curious cider-press cut by Bartram in an outcropping ledge; and at the present southern boundary of the grounds there is an effective group of Beeches growing on another ledge that juts into the river.

In the southern part of the grounds are the fine Magnolias; one of them, *M. acuminata*, undoubtedly that brought from "up Susquehanna," and discovered on Bartram's journey with Conrad Weiser to the Five Nations' Council (1743). Near by grows the "Rose Bay," as they first called the Rhododendron, and a noble Mossy-cup Oak, one of the finest trees on the place.

Not many years before his death, Bartram, probably in acknowledgment of the courtesy of a life-membership presented him by the trustees forty years earlier, gave the "Philadelphia Library Company" some of his most valuable books, several of them presentation copies from the authors; among these latter is the fine edition of Dillenius' *Historia Muscorum*, of which he says, "I take this work to

be the completest of the kind that ever was wrote, for Solomon did not write of any plants lower than Hyssop, so we may conclude he knew as little of mosses as of America." It is the intention of those now in authority to collect, if possible, relics from their present owners and form a Bartram museum in one of the rooms of the house. As yet the precise lines upon which this will be formed are unknown, but a mere collection of relics will only be interesting to those who know something of Bartram's lifework. It is to be hoped that the collection will include copies of the "Letters" and the "Observations on the Inhabitants, Climate, Soil, Rivers, Productions (Animals and other matters worthy of notice) made by Mr. John Bartram in his travels from Pennsylvania to Onondago, Oswego and the Lake Ontario." Printed by J. Whiston and B. White, Fleet Street, 1751.

Then, if a collection of portraits (old engravings preferably) of Bartram's correspondents could be hung in one of the rooms, and a series of charts of his journeys arranged in chronological order, there would, no doubt, soon be an understanding and appreciation of the work of this remarkable man.

Of nearly forty correspondents, all were men of distinction in their time, and some of them for all time. His journeys began with botanical trips in his own neighborhood, grew in distance and wealth of observation, and culminated when he was nearly seventy, in the exploration of four hundred miles of the St. John's River, Florida. Out of his great but unfulfilled desire to explore the Mississippi Valley grew that idea of exploring the Missouri country, discussed immediately after the Revolutionary War, by Franklin, William Bartram and the Marshalls. This discussion and hope became almost a reality ten years afterward, when Dr. Wistar wrote to one of the Marshalls that "Mr. Jefferson and others are much interested . . . and think they can insure a thousand guineas to any one who undertakes the journey, and can bring satisfactory proof of having passed across to the South Sea. If thee can come to town and converse with Mr. Jefferson, I am confident no small matter will stop them."

Something happened, for ten years later, when the expedition started in 1803 that was to give us the Oregon country as proof of having reached the South Sea, we know it was led by Lewis and Clarke, but Jefferson's instructions to them read like extracts from Bartram's letters.

If some of this may be learned in the house where Bartram wrote and pondered it will lift the work of protection and restoration, now in progress, far above the plane of mere preservation of an historic place.

Ann Harbor, Mich.

M. L. Dock.

Foreign Correspondence.

London Letter.

PYCNOSTACHYS URTICIFOLIA.—Flowering specimens of this beautiful Labiate plant have lately been received at Kew from a garden in Rotherham, where they were grown from seeds imported from south Africa. The plants grew to a height of three feet in a year under greenhouse treatment and produced terminal spikes of rich blue flowers, of the same shade as the flowers of *Salvia patens*. The species was first described and figured in *The Botanical Magazine* in 1863 (t. 5365), where it is said to have been raised and flowered by Messrs. Backhouse, of York, from seeds sent by Dr. Livingstone, who collected it on Mount Zomba, near Lake Nyassa. It flowered with Messrs. Backhouse in January. It is well worthy of cultivation, and would probably thrive out-of-doors in summer. The genus is allied to *Plectranthus* and *Coleus*. *Pycnostachys urticifolia* has nettle-like green leaves, and the flower-spikes are from four to six inches long. Sir William Hooker anticipated for it great favor as a garden-plant, but it appears to have gone out of cultivation. Its reintroduction from Livingstone's country is therefore satisfactory.

PENTAPTERYGUM SERPENS.—This is a Himalayan ally of

Vaccinium which has been cultivated at Kew for the last fifteen years and has flowered every year in a greenhouse about this time of year (March). It is a beautiful plant; the arching stems, rising from a woody root-stock to a length of five feet, are partly clothed with shining, green, myrtle-like leaves and fringed for nearly their whole length with pendent tubular flowers an inch long and colored blood-red, with darker V-shaped lines. The flowers remain fresh

WELDENIA CANDIDA.—I noted this plant in 1894, soon after its introduction to Kew from Guatemala, where it occurs only on the crater of the Volcan de Agua. Since then it has improved under cultivation, and it has been in flower in a cold house along with Cape Heaths all winter. The stems, which are about nine inches long, are formed of the closely folded bases of the leaves, as in a *Crinum*, the leaf-blades forming a spreading rosette about eight inches in



Fig. 15.—Bald Cypress, *Taxodium distichum*, in Bartram's Garden.—See page 124.

upon the stems for about two months. Such a specimen as this at Kew takes about twenty years to grow, but, once acquired, it is a most valuable plant for the conservatory, practically looking after itself if only a little water be given to it now and then, and when it comes into flower it is universally admired. It can be multiplied from cuttings of the young branches. Mr. Elwes, who collected this plant in the Himalayas, found it growing upon trees with *Cœlogynes*, etc.

diameter. The flowers are developed two or three at a time from a central capitulum, each flower having a tube two inches long and a spreading limb of three ovate concave segments about an inch across; they are of the purest white, with a cluster of pale yellow anthers. The root-stock is fleshy, and during the autumn the plants are allowed to rest for about two months. The genus is monotypic and is allied to *Tradescantia*. It is propagated by division of the root-stock.

HYBRID ROCHEAS.—*Rochea jasmineea* and *R. coccinea* are two well-known greenhouse plants, the former, with short crowded stems bearing small heads of erect, tubular, white jasmine-like flowers; the latter, often called *Kalosanthes*, with taller thicker stems and larger clusters of bright red flowers. These two were crossed a few years ago by a Belgian horticulturist, and the progeny were distributed by Monsieur Pynaert, of Ghent. They are now popular with some of the growers for market near London, large numbers of them being grown in the convenient "forty-eight" pot, and sold for about a shilling each when in flower. They form dense tufts of stems about nine inches high, each bearing an erect umbel of white, carmine, rose and bright red flowers. They bloom in early summer. No plants are more easily grown, a light frame or greenhouse, such as suits a *Pelargonium*, an open soil, plenty of water during the growing season and frequent stopping of the stems in the early stages being the chief of their requirements.

TECOMA SMITHII is still flowering freely here, so that plants have been in flower now for the past four months. They are single-stemmed plants, two feet high, clothed from base to top with healthy pinnate leaves and bearing at the apex a beautiful cluster of from twenty to fifty flowers, which are rich yellow, faintly tinged with red on the outside of the corolla. This is a greenhouse plant for the million. It can be grown as easily as *Chrysanthemums*, and it never fails to flower if the following directions are observed: (1) Cuttings to be struck in early spring in heat; (2) the plants must be limited to a single stem, all laterals to be removed as soon as they start; (3) when the buds show at the apex lateral shoots will push near the top, which must be removed, or they will prevent the buds from developing; (4) the plants should be kept in a cool airy house or frame from October till the flowers are over.

DAPHNE INDICA.—This is one of the choicest of greenhouse plants when it is successfully cultivated, but it has fallen into neglect because of its miffiness. I believe this is due entirely to the fact that the plants supplied by nurserymen hitherto were grafted and not grown on their own roots, *Daphne Mezereum* or *D. Pontica* being used as stocks. Messrs. Low & Co. have, however, discovered that cuttings of *D. Indica* will strike root readily if planted in small pots in a hot frame in early spring, and that plants thus rooted grow freely and flower profusely. A few plants of this *Daphne* placed about in conservatories when in flower give off a most pleasing odor. I have seen good specimens grown by setting the plants in a rich border in a sunny position in a conservatory. Several plants have survived the past three winters against a warm south wall out-of-doors at Kew. The species is a native of Japan.

PRIMULA IMPERIALIS, the Royal Primrose from the high mountains of Java, continues to thrive here in a cool house or frame. It is apparently a biennial, seedlings flowering when two years old and then perishing. Plants have been tried in various sheltered positions out-of-doors at Kew, but they have always succumbed to the first severe frost. In Cornwall, however, it can be grown out-of-doors permanently, for plants have lived in a garden at St. Austell for two winters, and the winter of 1894-5 was a record one. I believe this plant would sport freely and produce variety in color and size in places where the conditions were exceptionally favorable to its growth. It has, no doubt, considerable capabilities if placed in the hands of a clever breeder favorably situated. A *Primula* with a rosette of leaves nearly two feet across and erect spikes three feet or more high, bearing whorls of deep yellow flowers like those of *P. Japonica*, is essentially a plant to be looked after.

PERSIAN CYCLAMEN.—Growers of this plant in England have lately proved that although German growers are successful, English are even more so. Exhibits from some of our leading metropolitan cultivators of the *Cyclamen* were lately pitted against plants from the best of the German growers, and the English plants were better, both as to quality of strain and cultural excellence. I have lately

seen establishments where from ten to twenty thousand plants of this *Cyclamen* are raised annually. The seeds are sown in September and the seedlings are treated as stove plants till about the following June. By the end of the year they are bouquets a foot through of healthy leaves and from twenty to fifty expanded flowers. Two-year-old plants have been grown near Kew which measured twenty-six inches in diameter and bore a hundred and fifty expanded flowers; all this, too, in an eight-inch pot. Great improvement in the size and color of the flowers has been made in the last few years; a rich blood-crimson break being very much favored now.

SENECIO BOURGÆI.—This is a handsome winter-flowering greenhouse plant, a near ally of *Senecio cruenta*, the parent of the garden *Cineraria*, and a native of the same country—that is, the Canary Islands. Plants of it have been in flower for the past month at Kew; they are about a yard high, the leaves are pale green, the under surface clothed with soft white wool, and the petioles bear ear-like lobes, as if the leaf had attempted to be pinnatifid. The flowers are larger than those of *S. cruenta* and of a rich purple color. It is probably an annual. Breeders of *Cinerarias* may find it useful. A figure of it was published in *The Botanical Magazine* in 1853 (t. 4994) under the name of *Doronicum*, and it is there spoken very highly of as an ornamental greenhouse plant. We are indebted to the Cambridge Botanic Gardens for its introduction.

London.

W. Watson.

Plant Notes.

CERCIDIPHYLLUM JAPONICUM.—We have lately received a photograph of one of these trees growing on the grounds of a correspondent on the banks of the Hudson, which represents a specimen some twenty-five feet high and of perfectly conical shape. The tree at this stage of its growth is certainly beautiful, and as it seems to be perfectly hardy and not subject, so far as observed in this country, to any serious disease, there is no reason why it should not take high rank among our ornamental trees. In Japan it becomes a large tree, and in moist, deep, rich soil it often attains a height of a hundred feet. Sometimes it grows with a single stem three or more feet in diameter and rising fifty feet without branches, but usually a cluster of stems unite together at the base into a stout trunk and then diverge gradually. The photograph of a tree of this kind, with a trunk circumference of twenty-one and a half feet, was reproduced in vol. vi. of this journal, page 53. When young the tree is fastigate, the branches hugging the trunk closely, with the apparent purpose of protecting it against the rays of the sun, which seem to injure it at early stages of its growth. At this early season the slender branches of the trees hereabout are plump with sap, the red-brown bark is bright, and the leaf-buds, apparently, are already beginning to swell. In fact, the *Cercidiphyllum* is among the first trees to show its leaves in spring. These are at first a bronzy red, with bright red stalks and narrow red stipules, and they present a striking appearance at this season. Neither the flowers nor fruit are conspicuous, but the foliage, which is abundant when the tree stands in rich soil, and rather thin in more sterile situations, is a dark green during summer and turns to a clear yellow in the autumn. The *Cercidiphyllum* is a valuable timber-tree in Japan, producing a wood which somewhat resembles that of the *Liriodendron*, to which it is closely allied, and the Ainos of Japan use it for canoes as the Indians of our own country once used the wood of the Tulip Poplar.

MAHERNIA VERTICILLATA.—This is a subshrub or woody perennial which has been cultivated for seventy-five years, and yet it is seen more rarely now than it was thirty or forty years ago. The bright yellow bell-shaped flowers are very pretty and abundant, and it used to be seen often drooping about vases and sometimes in hanging baskets, for it is not a compact upright grower, but rather spreads around in a straggling fashion. In Florida, where it flourishes out-of-

doors, in a single season it will creep over the ground so as to cover a space a yard across, and in a window at the north or in a cool conservatory it will bloom through the winter and spring, and it may also be flowered out-of-doors in the summer-time. After all, perhaps, the most interesting quality of this plant is its fragrance, the flowers being as sweet as Lilies-of-the-valley, so that, indeed, it takes rank with *Boronia megastigma* among the plants which are conspicuous for a distinct and pleasing odor.

Cultural Department.

Vegetable Notes.

THE weather experienced here during early and middle March has proved uncommonly severe, and the probabilities now are that the ground will not be in suitable condition for seed-sowing and planting until later than usual. We have taken advantage of recent severe weather, when there was no snow, to have manure carted or wheeled on all ground not dug in the fall. This work should on no account be left until the earth is soft, when the operation is both disagreeable and laborious. Pea-brush has recently been secured and pointed ready for use; also Bean-poles. These and other seemingly unimportant little duties performed now will materially lessen the strain when the busy season is in full swing.

Lettuces planted out in frames early in February are now well headed and ready for cutting. Plants set out in October gave us a constant supply until these came in. Later batches have recently been planted in a gentle hot-bed, while additional sowings are made fortnightly. We find no difficulty in having a constant supply of lettuce during all the winter. White-seeded Tennis Ball still proves the best all-round variety with us. A sowing of Radishes is made between the Lettuce rows. From February onward these are ready to pull before they interfere with the Lettuce. An early sowing of Carrots, of the French Horn variety, and Beets have recently been thinned out. We grow rows of Radishes between these crops, and they are ready to use before the Carrots and Beets are of much size. Our earliest batch of forcing Erfurt and Snowball Cauliflower are now in four-inch pots, and will be transferred to a gentle hot-bed about March 25th. A later sowing recently made will give us nice plants by the time they can safely be set outdoors in this latitude. Early Cabbage have just been pricked off in a frame. We have just made our first hot-bed for Cucumbers, having delayed it somewhat owing to the severe weather. This, and, indeed, all other vegetable frames, will need to be well matted up on cold nights, and careful attention must be given to watering and ventilation. This is a suitable time to make a sowing of Egg-plant and Peppers, and as greenhouse space is just now pretty well occupied, the seeds may be started in a Cucumber-frame. Parsley planted in frames last fall will now be making good growth; an occasional soaking with liquid-manure will improve it. Care should be taken at this season to use tepid water for all plants in frames. Soaking them with water of almost ice coldness drawn from a faucet outdoors chills the plants and checks growth.

Our earliest sowing of Celery is now almost large enough to prick off. We use equal portions of White Plume and Paris Golden for a first batch. We still have some good heads of Kalamazoo in the trenches outdoors, which will give us a supply until Easter. This winter has not been favorable for keeping Celery in the open, since there has been a succession of freezings, thawings and heavy precipitations. But we are more convinced than ever that it keeps best banked up where it is grown, while the flavor is vastly superior to the stored heads usually seen on the markets. Tomatoes for our main outdoor crop have just been sown. These make strong plants by the middle of May, which is quite as early as we can plant them out here with safety. An earlier batch has just been boxed off. These will be grown along and transferred to six-inch pots later in the season. By planting-out time they will have one or two bunches of fruit set on each plant, and under favorable conditions will give ripe fruit by the end of June or first week in July. The most satisfactory forcing kind we have grown this winter is Eclipse, a variety introduced by a Scotch firm of seed merchants two or three years ago. Plants in ten-inch pots are carrying bunches with from six to ten fruits on each, averaging about a dozen bunches per pot. The fruit is uniform in size, fully as large as Chemin, but without the three-cornered appearance of that useful variety. Comrade, which we have grown a few pots of, gives some remarkably large bunches. Some have as many as fifteen fruits on, but the

fruit is more irregular in form than Eclipse. May's Favorite is a good forcing variety and sets well after February. It proves much better than President Cleveland. Nicholson's Hybrid as an early-winter forcer is excellent; it lacks size, however, and compares unfavorably with some other kinds after this season. Our tallest batch of plants for indoor culture are now in four-inch pots; an earlier lot is ready to transfer to fruiting-pots, and will be grown where space will permit in our cooler divisions. Artificial pollination is now unnecessary. Giving the plants a shake about the middle of a bright day will distribute the pollen. Laterals and decaying foliage must be removed each week and sufficient foliage cut away to give the fruit all the sunlight possible. The plants require copious supplies of water, and we scatter a handful of sheep-manure or Bowker's fertilizer on each pot once a week, in addition to liquid stimulants. That this treatment is appreciated the network of roots on the surface of the pots testifies. Where Mushrooms are grown wood-lice are apt to prove rather troublesome. We find that by placing a small wisp of straw in a dry corner of the bed most of them will congregate there, and they can be easily destroyed with scalding water. If not looked after they will do untold mischief to the crop. We find that home-made spawn gives us better results than English Milltrack, and gives us mushrooms two weeks ahead of the imported spawn.

Onions produce so much finer bulbs under what is sometimes called the new culture, although in reality it is a very old practice which has been adopted for the production of specimen bulbs, that even market growers find it pays to adopt it. Our seed was sown in shallow boxes about February 20th on the shelf of a cool house. In a few days these will be transferred to a frame and gradually hardened off. All varieties are improved in quality by being raised in this way and pricked out; some kinds, such as Giant Rocca, Prizetaker and Silver King, more so than others. All who have not given this mode of culture a trial should do so.

Taunton, Mass.

W. N. Craig.

Sensitive Oxalids.

THERE are at least four species of *Oxalis* in common cultivation the leaves of which are sensitive to the touch. They are *O. (Biophytum) sensitiva*, *O. (Biophytum) dendroides*, *O. Ortigiesi* and *O. bupleurifolia*. The two varieties of *O. Biophytum* are, of course, closely related, and in appearance are pretty nearly alike, the first being the more sensitive and preferable as an ornamental plant for the conservatory or window garden. The flowers are almost stemless and produced in the heart of the pretty rosettes of leaves which terminate the branches. The leaves are pinnate, with from twelve to twenty pairs of leaflets. On being touched these leaflets close downward until those on opposite sides of the leaf-stem touch each other, just the reverse way in which the common Sensitive-plant, *Mimosa pudica*, closes its leaves when interfered with. From some cause this plant sets seeds poorly with me; although I have grown the same specimen for over ten years, it has never yet reproduced itself from seed. The upper part of the leaf is bright green, the under side of a reddish hue. It is quite an interesting plant to have in a greenhouse, as it will close its leaves on the slightest provocation. *O. dendroides* takes alarm less easily, and sometimes, especially when it is grown cool, it scarcely closes its leaves at all when touched. The reproductive qualities of this species are such that when introduced into a greenhouse it is not long in permanently establishing itself; the seeds set very freely, and it would seem as if they all germinated, for they come up in every conceivable place where it is at all possible for a plant to live. It is especially at home in the pots of other plants, and so pretty is it when growing in this way that one grudges to pull them out. Its flowers are on long stalks clear of the leaves. The rosettes are arranged in the same way as in *O. sensitiva*, and they are green on both sides. The plant does not have the same branching habit as *O. sensitiva*; the flowers of both are pinkish white. *O. Ortigiesi* is a well-known plant in our greenhouses, the whole plant, excepting the flowers, having a brownish metallic hue to it. The flowers, which are borne on long stalks, are bright yellow in color. The leaves are trifoliate, and when disturbed droop downward. The stem is of a succulent nature, and young plants are easily raised from cuttings. *O. bupleurifolia* is a dwarf shrub; it has leaves unlike any of the other four; when the plant is in a young state or in poor health the leaves are not developed at all, but, instead, there are leaf-like formations called phyllodes, which, when the plant is strong, develop trifoliate leaves at the extremities. This species has yellow flowers in the axils of the phyllodes. It is propagated from cuttings, and, apart from its sensitive nature, it is of little horticultural value.

Botanic Garden, Washington, D. C.

G. W. O.

Garden Annuals.

IT is now generally admitted that for the best and most continuous display of flowers during the whole of the summer season annual plants are essential. Perennials can be relied on for early flowers before tender annuals can be even planted out, and they will also furnish a late fall display after the advent of frost. The most approved practice, therefore, is to so combine the two that there be no intermission, and this is not difficult if a little care in selection and a little foresight in planting be exercised. We have this week made such sowings of the earliest annuals as may be deemed necessary, and at a later date, say at the end of this month, the general sowing of all such seeds as are planted each season will be made, and this will be found a good time if a hot-bed or a greenhouse be at hand to place them in after being sown. The old-time plan of sowing in a hot-bed is not to-day superseded. There is no better place to obtain the proper conditions that insure even germination and a sturdy aftergrowth than a hot-bed of moderate heat if an inch or two of earth be spread over the fermenting materials to prevent an excess of steam. This is also a good place for plunging the pots or pans, but a warm greenhouse is most generally used where it can be commanded, although it is not at all essential.

For the sowing of all seeds it is well to compound the soil in such a way that it will neither become hard on the surface so as to prevent the young cotyledons from pushing through, nor dry out too quickly. No mistake is more fatal to successful germination than allowing the soil to become dry just as the seeds are about to sprout, and to avoid this we set the pans or pots altogether in a warm place and cover them with paper until germination takes place, when they are taken out as fast as the cotyledons are well developed and set apart in a lighter position; this covering will prevent too rapid drying, will also tend to guard against extremes of temperature, and is altogether the best way to save labor in watering and get the best returns for work and care. Soil for seed-sowing must always be made light in texture as well as weight by the addition of plenty of leaf-mold, and if the compost from a spent mushroom-bed is available it is well to add at least one-third of this, sifting the whole well, and after the seeds are sown covering them with soil that has passed through a sieve with a mesh no coarser than one-eighth of an inch. A sprinkling of sand over the surface of the top will prove a good index as to state of the soil as to moisture, as it is then possible to see at a glance if water is needed. These little details may seem frivolous, but are in themselves the secret of success in getting good returns from seeds that are either slow to germinate or of weak vitality.

It may be well to name a few of the annuals that we have found to fill all the requirements for display in the garden and to be at the same time available to cut for house decoration; and it may be added here that if a plant does not produce flowers that are fit for this latter use it is hardly worth while to grow it. There are so many plants now that are good for both purposes that we have a sufficiently long list of these alone to choose from ordinarily. Zinnias we regard as indispensable to even the smallest garden; they have done more toward filling the place of the scarlet Geranium than all the other forces together; they are easily raised from seed, and give a profuse and abundant bloom for at least three months; we use the tall and dwarf strains—a double row, one of each, makes a fine effect in a long border, or if used in the mixed borders they may be planted in groups where other plants are likely to die down early in the season, as sometimes happens with early-blooming perennials, and they will cover the ground and give a bright effect just when it is most needed, during the early fall months. Good Asters are as essential as Zinnias, but we here also prefer the tall kinds with long stems, such as those known locally as Boston Market, for early use, and the new branching kinds which are admirable later. There are so many strains of Aster now on the lists that it is perplexing to know just which to select, but it is safe to add some each of the old standard kinds from the Pæony and Victoria sections, for example, as these are as good as any for a display, and they also have a good length of stem.

There has been an amazing improvement of recent years in the Antirrhinums, and seed of good strains will produce flowers that would hardly be recognized as the old-time Snapdragon. They are continuous bloomers from the time they begin until after frost, and may be even taken up and put in the greenhouse for a winter crop if kept from flowering for a few weeks before lifting, when they will give a spring crop of bloom that is most acceptable. The annual Scabious are good, too, for cutting, and give a great profusion of bloom; these

may be sown outdoors when the soil is warm and will do best in this way, but a few started now will give earlier flowers.

The new Japanese Ipomœeas are well worth a trial if a good strain is secured, but there are some that are inferior, and this has brought into bad repute a most interesting novelty among summer flowers, one of the best of its kind for a number of years. The flowers are of almost all shades of blue, purple, crimson, pink and many other intermediate shades, all of silkiest lustre; many of them, too, are double, and the foliage is in many cases beautifully marbled or mottled with silvery white, or golden bronze. These Morning Glories are perennials, but are better raised from seeds each year, unless some specially good variety is worth keeping over in the greenhouse. The seeds are hard-shelled and need to be scratched through the outer shell with a knife and put in water for a few hours till they swell, and if planted then they will germinate in a day or two. These plants are useful for fences, piazzas, arbors and any other place where a climber of quick growth is desired for the summer months.

The Celosias are worth trying; in fact, they have been successfully tried in some places as summer annuals in the border. We hope to make trial of them more extensively this year. Though they have generally been grown in pots, they will do much better in the open ground if strong when set out, and the season of bloom is so long as to make them specially valuable in the border. Care should be taken to save the weak seedlings, as these often carry the best plumes, the strong vigorous growers often making no plumes worth the name even in pots where root-room is restricted. Last summer I saw the new *Nemesia strumosa* splendidly in bloom in Mr. Chamberlain's garden, at Manchester, and when well grown, as these were, there are few annuals so showy for a sunny position. They have been somewhat disappointing here, but this was evidently due to a failure to understand all their necessities. The seed must be sown in pots to insure germination, they are so small.

In a dry, sandy, poor soil, which must sometimes be occupied, there are a few annuals that will do better than in richer compost; indeed, I have failed altogether to flower the scarlet *Salvia* in the ordinary border, where they never stopped to bloom, but kept on growing until frost cut them off. In dry positions, however, where the soil is poor, they will produce a blaze of color, and are not to be despised as cut bloom for house decoration. Petunias of the improved strains are also well adapted to such soil, where they grow rapidly and flower profusely, and a margin of *Portulacca* will complete a pretty effect in a spot not easy to make beautiful under other treatment. With Sweet Peas, as with Asters, it is a difficult matter to select the kinds to grow from such a long list, but, given the colors that are desired, they should be planted as soon as the frost is out of the ground and it is possible to work it conveniently. We do not like to plant in the same place year after year, but always take out the soil to the depth of at least eighteen inches, placing at the bottom of the trenches good manure, filling up to within six inches of the top and then sowing the peas. It is then possible to add a little more earth later on at staking-time, and still leave a trench to pour on water when it is needed. They are very thirsty in the flowering-time, and we leave the hose running in the trench all night, to their great delight. The annual sales of Sweet Pea seeds have come to be one of the most remarkable features of modern horticulture. They are grown by the ton in California, and no better samples are to be found. There is no excuse for foreign-grown seeds, and, indeed, we hear little of them now, compared with what we heard a few years ago. Even English novelties are now sent to California, where they are grown to secure stock for selling. The climate is well adapted to them, and their cultivation has been reduced to a profitable system. I find that other seeds grown in California as well as Sweet Peas are well acclimated, and thrive better here than those of European origin do.

South Lancaster, Mass.

E. O. Orpet.

Physianthus albens.—This is a pretty climbing Asclepiadaceous plant from Brazil. The common name, White Bladder-flower, is simply a translation of its botanical name. Although an old plant, and once quite common, it was not until last summer that I chanced to see it, when I was at once attracted by the large number of cutworm moths which the flowers had entrapped. For this reason it was named the Cruel-plant by the late Dr. George Thurber, of Passaic, New Jersey, who thus describes the contrivance: "The anthers are so placed that their spreading cells form a series of notches in a ring around the pistil. The insect, in putting its proboscis down for the honey, must pass it into one of these notches, and in attempting to withdraw it the end is sure to get caught

in a notch, bootjack fashion, as it were, and the more the insect pulls the more its trunk is drawn toward the end of the notch. Thus caught, the insect starves to death." The plant is quite easily propagated from cuttings. The usual plan of cultivation is to trim plants in, which have been blooming all summer, and keep them rather dry during the winter in an ordinary greenhouse. It is very effectively trained to a post or trellis.

Wellesley, Mass.

T. D. H.

Correspondence.

Shrubs which Flower in Early Spring.

To the Editor of GARDEN AND FOREST:

Sir,—Will you be kind enough to give a list of shrubs which flower very early in the spring? I have a lawn with a warm and sunny exposure, and I should like to border it with a shrubbery which will make some sort of floral display before the great mass of spring-flowering shrubs are in bloom.

Bordentown, N. J.

R. A.

[Perhaps *Chimonanthus fragrans* would survive the winter in our correspondent's latitude, though it is not reliably hardy much north of Washington. Its remarkably sweet-scented flowers appear very early. The long wands of *Jasminum nudiflorum* are covered with bright yellow flowers very early, also, but this, too, is doubtfully hardy except from Philadelphia southward. *Corylopsis pauciflora*, which was brought from Japan some years ago by Dr. Hall, is perfectly hardy. It belongs to the Witch Hazel family, and bears pale yellow flowers. *C. spicata*, a rarer shrub, is hardy in Philadelphia, and its flowers are more showy and interesting, of richer color and with an odor which reminds one of Violets. *Fothergilla Gardenii*, a native of our southern Appalachian region, is also a member of the Witch Hazel family, and, although it has been grown in English gardens for more than a century and a quarter, it is rarely seen in American gardens. It is perfectly hardy, and the flowers, which appear before the leaves at the end of all the branches, cover the plant with brush-like masses of long white stamens, which have a very curious and beautiful effect. It is a shrub of good habit all summer long. The old-fashioned Cornelian Cherry, *Cornus mascula*, with its abundant small yellow flowers, is a first-rate plant, and later in the season its cherry-like fruit is attractive. *Daphne Mezereum*, a stiff upright shrub with fragrant rose-colored flowers, should come in the list. Our native *Andromeda floribunda*, an exquisite shrub with evergreen leaves, and the Japanese *Andromeda*, a more spreading shrub with broader panicles of handsome white flowers, should both be planted. Two Chinese Bush Honeysuckles, *Lonicera fragrantissima* and *L. Standishii*, both display their odorous flowers before the leaves appear. The native Leather Wood, *Dirca palustris*, the Yellow Root, *Xanthorrhiza*, the fragrant Sumach, *Rhus aromatica*, all have inconspicuous flowers which appear very early, and the last two are useful for connecting the turf on the borders with the taller plants in the rear of the shrubbery. Some of the Currants, like *Ribes saxatile*, *R. alpinum* and the native *R. aureum*, have handsome and fragrant flowers. The little Heath, *Erica carnea*, rarely more than a foot high in this latitude, is very interesting in early spring on rockwork, and, of course, if there is a place for the Mayflower, *Epigaea repens*, this should not be neglected. Some of the bush Cherries, like *Prunus tomentosa*, *P. Davidiana*, and the Sweet Almond, *P. Amygdalus*, are very desirable, and they will be still in bloom when *Spiraea Thunbergii* opens its profusion of pure white flowers and the Forsythias are in the full splendor of their bloom. For full descriptions of all these shrubs and for figures of several of them we must refer to back volumes of GARDEN AND FOREST.

A place like one of the small openings in the Ramble of Central Park, if bordered with shrubs of this sort, might be made especially attractive. Into the border some of the Hazels and other plants with conspicuous catkins could be admitted, and behind the border would be a suitable place

for early-flowering trees, among which the Swamp Maple and the Red Bud and tall shrubs, like our Spice Wood, could be made prominent. Shrubs, like *Magnolia stellata*, with very showy bloom, perhaps, might be discarded from a quiet nook like this, and even Forsythias might be too glowing in color. But, certainly, such a lawn would be most interesting just after winter has relaxed its hold. —Ed.]

Recent Publications.

The Spraying of Plants. By E. G. Lodeman, Instructor in Horticulture in Cornell University. With a preface by B. T. Galloway, Chief of the Division of Vegetable Pathology, United States Department of Agriculture. New York: Macmillan & Co.

The literature of horticulture must more and more from this time on fall into the hands of professional men and students. There is so much of science attached to the art of horticulture, so much detail, such an accumulation of experimental facts and methods, that it is now beyond the powers of the layman to digest and collate these stores. The coming literature may not be in all respects better than the old, but it will be different in type, and it will certainly gain in freedom of treatment and in the breadth of its mission, and it will be freer from provincialism and dogmatism and hereditary errors. Mr. Lodeman's book on spraying is a noteworthy illustration of the modern horticultural treatise. Ten years ago spraying against insects and fungi was practically unknown as an important, or as even an accredited, operation, and yet here is a volume of four hundred pages devoted to the subject. All the practice has been developed since Downing, Barry and Thomas and other authorities wrote or revised their books, and the special literature on the subject is now so extensive that only a specialist can master and classify it for use. Two hundred and thirty closely printed pages are given to the history and principles of spraying, in which the gradual advancement of our knowledge is set forth, together with the principles which underlie the practice. The remainder of the book is taken up with specific directions for the spraying of cultivated plants, with descriptions of the most important insects and fungous diseases affecting them and the method of treating each. Mr. Lodeman has gathered the results of an immense amount of experiments, both in Europe and America, and his book can be trusted, not only as a manual of practice, but as a true and well-classified record of our knowledge on this subject at the present time.

We have received the interesting *Hand List of Orchids Cultivated at Kew*, and find it a very useful little manual for all who have to deal with these plants. The brief preface contains many interesting historical facts in relation to the growth of the collection there, and the list comprises nearly two thousand species and garden hybrids. Wherever possible there is a reference made to a figure, and as the list is only printed on one side of the leaf there is abundant room for annotations. There are many collections where Orchids which bear the fashionable and popular flowers are more largely represented than they are at Kew, but this one is particularly strong in the so-called botanical Orchids, which are absolutely essential to the student who wishes to gain a complete knowledge of the family. Of course, dried specimens of the botanical Orchids can be had in herbaria, but a living plant is better for purposes of study than a dead one, and it is by an examination of living plants alone that we can observe the contrivances for cross-fertilization which so interested Darwin and many other naturalists.

Notes.

One of the most striking features in some of the florists' windows now are exceptionally long and full-flowered spikes of *Gladiolus*, probably the variety *Shakespeare*. The large flowers are white, with light stripes of carmine or rose color

at the base of the petals. Trailing *Arbutus* is also becoming quite abundant. The greater proportion of it now comes from North Carolina.

According to a correspondent of *The Gardeners' Chronicle*, the most interesting collection of *Coleus* ever made has been on exhibition this year at the Royal Botanic Garden, in Portici, Italy. The plants are of the most varied dimensions, from dwarf forms a foot high to the gigantic varieties six feet in height, with branches covering a circle ten feet in circumference and stems five inches in girth. The leaves of some of the plants are as much as eighteen inches long and thirteen inches wide, and they have broken into a wonderful variety of colors.

At the recent Fruit-Growers' meeting at Worcester, Massachusetts, complaint was made that the Japanese Plums were short-lived and not hardy, and that the cold this winter had killed all the fruit-buds and many of the limbs on some of the trees. To this it was replied by Mr. Hale that when these Plums were first sent out they were budded on Peach stocks, and this may be a reason for their lack of hardiness and their liability to disease. Nevertheless, it is not wise to plant these Plums very largely in central and northern New England until more thorough tests of their value have been made.

In a list of 106 varieties of Sweet Peas tested at the Cornell Experiment Station last year the few classified as "very good" are said to have some superlative merit—that is, they are better in some points than those which have attained the accepted standard of excellence in the modern improved Sweet Pea. The varieties in this list are these: Adonis, Apple-blossom, Blanche Ferry, Boreatton, Butterfly, Captain of the Blues, Cardinal Wolsey, Countess of Radnor, Duchess of Marlborough, Emily Henderson, Empress of India, Improved Painted Lady, Isa Eckford, Lemon Queen, Mrs. Gladstone, Tangier Scarlet.

The prices of California oranges have advanced somewhat with the greater scarcity of the West India fruit, and Navel oranges from the Pacific coast sell readily for \$3.00 to \$4.00 a box at wholesale, seedlings commanding \$2.50 to \$3.25. Jamaica oranges bring \$9.00 to \$10.00 a barrel, repacked, and the few now coming from Havana sell for \$5.00 to \$6.00 a barrel, in original packages. Of oranges from the Mediterranean, Catanas now bring \$3.00 to \$3.50 a box, and Valencias \$4.75 to \$6.00 a case. The stock of California Navel oranges, it is estimated, will be exhausted by about the middle of April. A small lot of Florida oranges which arrived here the latter part of last week sold for \$5.00 to \$6.00 a box.

In the new Hand List of Orchids, published at Kew, after some preparatory statement as to the modern practice of cultivating these plants, the writer adds that after all a considerable number of species submit to horticultural conditions with great reluctance. Among these are *Cattleya citrina*, *Dendrobium Macarthiae* and many species of *Oncidium*. That the proper method of cultivating these plants will be discovered in the future there is little doubt, since species which are generally difficult prove amenable to treatment in special cases, as, for example, *Diacrium bicornutum* is generally found intractable, and yet it is grown at Kew with little trouble, while it seems impossible to grow *Disa grandiflora* there with anything like the success attending its cultivation in Edinburgh and Chatsworth.

The Gardeners' Chronicle gives a picture of a new hybrid *Rhododendron* which has been raised at Veitch's Chelsea Nurseries and named *Eos* (The Dawn), perhaps because it is the forerunner of a new race of warm greenhouse *Rhododendrons*. It differs from the beautiful race obtained by crossing *Rhododendron javanicum* upon *R. jasminiflorum* in the bright carmine and scarlet color of its flowers, as well as in their form, their profusion and their persistency, since they last from three to four weeks in perfection. The pollen parent is *R. Malayanum*, a species widely distributed over Malaysia. Besides the three species already named, the new hybrid has among its ancestors on the female side *R. Lobbi*. From the table of its pedigree given, it appears that besides the four species named, there are four hybrids among its progenitors, and since all these plants are in cultivation, an interesting opportunity is offered to trace the influence of each in the successive crossings.

A bulletin on *Chrysanthemums* from the Cornell Experiment Station is interesting, not so much from its choice of varieties among the older sorts or its test of novelties as it is for certain suggestions for reformation in classification, nomenclature and the like. Everybody agrees that no flower should receive a vulgar or a bombastic name, and the naming of plants after Mrs. Judge This or Field Marshal That should be

discontinued. Particularly interesting is the study of variation in the forms of florets and some attempt to get rid of the confusion in catalogues about the way they are described. For example, it is important to know whether these florets of a given variety are ligulate or whether their margins are incurved, because single, intense, vivid colors are best displayed by a ligulate floret. In the variety *Crimsona* the general effect is red, but in *Miss Helyett*, which is of a similar shade, the margins are turned in so as to show the under side, and this produces a different effect altogether. There is an interesting discussion on problems of color, with notes about cultivation, and, altogether, the pamphlet is a neat monograph, which, while it contains nothing that is new, will encourage observation and study on the part of growers and lovers of these flowers.

The efforts of Secretary Morton to stop the shameful waste of money in the distribution of seeds have been brought to naught by a joint resolution of Congress which directed him to go on, as in former years, and spend \$150,000 for the purchase and distribution of seeds, bulbs, plants and cuttings through the various members of Congress. In accordance with this, Secretary Morton has sent out a circular to seedsmen, giving directions about putting up the seeds, which must be true to name and up to a certain standard of purity and germination, and free from smut, ergot, eggs and larvæ of insects, and seeds of certain specified weeds. The seeds will altogether weigh some 300 tons, and they are then to be divided among the members of the House and Senate into 450 separate packages. A few of the items are 1,300,000 packets of Lettuce, 130 packets to the pound; 1,200,000 packets of Radish, 60 packets to the pound; 1,040,000 packets of Beets, 400,000 packets of Cucumbers, 460,000 packets of Tomatoes, 320,000 packets of Garden Peas, 1,000,000 packets of flower seed of not less than seventy-five choice varieties, averaging 300 packets to the pound, with full cultural directions and description of growth to accompany each variety. The joint resolution became a law without the President's signature so late in March that it was not possible to undertake the dissemination of certain kinds of seed. The list selected includes such kinds only as could probably be purchased and distributed in time for planting throughout the country. With each item a percentage of purity and germination is given, and the seed will be tested by some employee of the Division of Botany in the Department of Agriculture, and Secretary Morton reserves the right to reject any lot which falls below the standard.

The cost of the seed is but an inconsiderable fraction of the cost of a vegetable garden, but the quality of the seed is a matter of too great importance to be neglected. It may look bright and plump and yet be worth little for planting. As a rule, our seedsmen are as particular as other tradesmen, but, after all, the planter is too often disappointed in his seed. In older countries legal restrictions have been thrown around this business, and in Germany alone there are forty seed-control stations, and many more in other European countries, and the quality of seed is said to have improved steadily since these stations were established. In order to obtain a clear idea of the actual condition of the garden seeds sold in Rhode Island, the Experiment Station of that state made some careful studies on the subject last year, and the report of the tests made appears in a bulletin just issued. A standard variety of each of thirteen common vegetables was selected and a sample of each was bought of nineteen different dealers in March last. The seed was generally clean and there was no indication that impurities had been intentionally introduced. In nearly two-thirds of the samples these impurities amounted to no more than one per cent. The seeds were then subjected to sprouting tests to ascertain their germinating power. In sixty-four out of 233 samples only five per cent. or less of dead seed was found, but in twenty-three others half of the seeds failed to germinate, and in twenty, three-fourths of the seeds were useless. This shows that some seeds are much better than others, and the buyer has no means of knowing the quality of the article he is getting, while the dealer who sells seeds of standard vitality and purity gets no advantage in price over his careless or conscienceless competitor who sells seed which is comparatively worthless. In several of our states the quality of commercial fertilizers is tested, and buyers now are more likely to secure the worth of their money in plant-food than they were before chemical manures were subject to inspection. Honest manufacturers, too, get the benefit of a state guarantee. It seems possible that some official guarantee of the quality of vegetable seeds could be devised which would protect the buyer and the careful seedsman in the same way.

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The California Forest Reservations.

IT is unnecessary, perhaps, to remind our readers that the reservations of the public domain made by the Government are of two classes: First, the so-called national parks, comprising the Yellowstone National Park, the Yosemite National Park, the Sequoia National Park and the General Grant National Park. These four parks comprise, together, about three million acres, the two last named, which are situated in Tulare County, California, having been established for the preservation of portions of the Sequoia forests. They are now all under the strict control and efficient protection of the army of the United States. Second, there are seventeen forest reservations, comprising, altogether, about seventeen million acres, or 26,500 square miles, a territory more than half the size of this state, and scattered from Alaska to Arizona, New Mexico, Colorado and Wyoming. These reservations have been withdrawn from sale and entry, but receive no more protection from fire, timber-thieves and sheep-herders than the non-reserved lands. The largest of the reservations, comprising nearly five million acres, includes, it will be remembered, the Cascade Mountain Range from the Columbia River nearly to the borders of California. An attempt is now being made, as was pointed out in these columns two weeks ago, to deprive this reservation of its value by opening a considerable part of it to entry. Next in extent is the Sierra Forest Reservation of more than four million acres, stretching along the southern Sierras for over two hundred miles, from the Yosemite National Park to the mountains east of Bakersville, with an average width of about fifty miles and containing the principal Sequoia forests.

Some interesting and reliable information concerning the actual condition of this reservation and of the Yosemite National Park is found in the seventh number of the *Sierra Club Bulletin*, which has just reached us. It contains the minutes of a meeting of the Sierra Club, a body of men interested in mountain exploration and in the forests of California, held November 25th, 1895, and, besides other matter, an address of the President, Mr. John Muir, and a report on the Sierra Reservation made by Professor William Russell Dudley, the distinguished botanist of the Leland Stanford, Jr., University. Mr. Muir, whose knowledge of

the Sierras and the Sierra forest is unequaled, passed six weeks last summer, it appears, in the Yosemite National Park, about the headwaters of the Tuolumne, and his remarks on the results of the four years' protection the park had received from the Federal Government are important and encouraging. He says:

When I had last seen the Yosemite National Park region the face of the landscape in general was broken and wasted, like a beautiful human countenance destroyed by some dreadful disease. Now it is blooming again as one general garden, in which beauty for ashes has been granted in fine wild measure. The flowers and grasses are back again in their places as if they had never been away, and every tree in the park is waving its arms for joy. In what we may call homœopathic doses, the quiet, orderly soldiers have done this fine job, without any apparent friction or weak noise, in the still calm way that the United States troops do their duty. In my wanderings this summer I met small squads of mounted soldiers in all kinds of out-of-the-way places, fording roaring boulder-choked streams, crossing rugged cañons, ever alert and watchful; and knowing, as we do, the extreme roughness of the topography of the park in general, our thanks are due these quiet soldiers for unweariedly facing and overcoming every difficulty in the way of duty. And always it is refreshing to know that in our changeful Government there is one arm that is permanent and ever to be depended on.

This testimony confirms what we have always believed, that the moral force exerted by a small troop of United States soldiers was capable of exerting an enormous influence in keeping marauders in the public reservations in check, and that by keeping out the sheep-herders soldiers could preserve the forests not only from the sheep, but from most of the fires which are set by the herders to improve the pasturage.

The observations recorded by Professor Dudley, who passed six weeks last summer in exploring the Sierra Forest Reservation and studying its condition, are equally instructive. The following is part of his report:

Where the sheep pass on the mountain slopes and summits, there, indeed, is the trail of destruction and death. Before them may be a pretty stretch tinged with hosts of red or yellow *Mimulus*. Behind them is the dust of a harrowed field. Before them may be a level meadow in the forest, such as none but an alpine sun ever shone upon; velvet-green is the tender grass, a thousand *Asters* of one form and color here, a thousand *Dodecatheons* of another form and color there, tiny rills of cold spring water dancing everywhere. Behind the herd are no flowers, the green grass has been reaped as by the reaper Death, the water is foul and festering. To pass from the trampled meadows of the reservation to the protected meadows of the National Park was a lesson in patriotism. The nation that could so effectively preserve the inoffensive plants, merely through the presence of a handful of its soldiers, was, indeed, a nation worth living for.

Professor Dudley, in the course of his journey, gathered a good deal of testimony from the mountain and foot-hill people in regard to the changes which had occurred during the past twenty years in the vegetation of the region which is now the Sierra Reservation. Their evidence all points to the fact that the undergrowth in the mountain forests has greatly decreased since they have been pastured by sheep. A horse can now be ridden through these high mountain forests, where twenty years ago it would have been practically impossible, on account of the underbrush, to have wandered from the beaten trails. The destruction caused by the sheep, which live on the young twigs of undershrubs and on annual plants, is greatly increased by herders who, in the autumn, on leaving the woods set fire to the undergrowth in order to insure an abundant growth of tender sprouts the following spring. Ranchmen and fruit-farmers of the valleys, who are dependent on the water of mountain streams, are now firm in the belief that the decrease in the undergrowth diminishes the flow of streams during the summer, considering, as is undoubtedly a fact, that the destruction of the underbrush has more effect on the stream-flow than the destruction of the large trees. The condition of White River is cited by Professor Dudley as proof of this general proposition. Formerly this stream is said

to have flowed in midsummer at least twenty-five miles lower than it does at present, being now dry almost to its source, 8,500 feet above the sea-level. Living springs once abounded on the ranches in the White River valley, which now all run dry in midsummer. There is hope for those who desire the preservation of the Sierra forests in the fact that the valley rancher detests the sheep-herder, whom he regards as a foreigner and a parasite, who intends to return sooner or later to France, or Portugal or Ireland, carrying with him his gains pilfered through sheep-raising on land not his own.

The condition of the woods on the reservation was often such as to cause Professor Dudley the greatest concern. Fires some time in the past have swept over a large part of it; not an old Sequoia has escaped fire, and most of the Pines and Firs bear evidences of the ravages of the flames. In the region south of Nelson's Fork of the Tule River the number of overripe or decayed Fir-trees is enormous, and these trees, dying apparently from old age, in falling are carrying down young trees and furnishing the best possible material for destructive forest fires. Professor Dudley was everywhere reminded of the lamentable contrast between America and Germany. The latter has forest schools and trained foresters, who cull out the ripe timber, remove and sell it for the Government. In America, whose forests are unexcelled in variety, beauty or value, we have no efficient system for preventing their destruction by fire, no schools for training a class of men to husband and develop the enormous forest resources of which we are the spendthrift heirs.

As a relief from this gloomy picture it is pleasant to learn from the testimony of ranchers and hunters that last summer there were probably not more than a third as many sheep in the Sierra Reservation as had invaded it the previous year, a decrease accounted for by the presence of the United States soldiers in the adjacent Yosemite National Park, which had alarmed sheep-herders and scattered their flocks.

In concluding his address Professor Dudley called the attention of the club to the fact that there are still large tracts of Redwood-trees standing in the coast-range region of California, and urged the establishment by the Government on unsurveyed lands of a Redwood reservation. This should be done, and done speedily, as we have more than once insisted. The Redwood is only inferior in size and interest to the Sierra Sequoia. Its value as a timber-tree and its accessibility doom it to destruction, and if the demand for Redwood lumber increases in the future as it has in the past, another generation will see the destruction of these peerless forests. The Redwood grows only on the California coast-ranges, and unless the Government will create a Redwood reservation, as it has a Sequoia reservation, the majestic trees which have been growing for two or three millenniums will be swept away forever.

We commend a careful study of this number of the Sierra Club's bulletin to all who are interested in the national forests and in the welfare of California. The address of the Secretary, Mr. Elliott McAllister, from whom probably copies can be obtained, is Academy of Sciences Building, San Francisco.

It is an unpleasant truth that, in spite of all that has been written and said on the necessity of forest protection in this country, the great mass of people still need to be instructed on this point, and since no comprehensive and efficient forest policy can even be devised without a more cultivated public sentiment, and since the best of laws would fail to be enforced without the quickening of the public conscience, every effort to arouse interest and disseminate knowledge on the general subject of forests, their uses and their management, is an occasion for gratitude as well as encouragement. We, therefore, commend, as an example to similar bodies, the action of the New Jersey State Federation of Women's Clubs at its recent meeting in Trenton. A prominent place in the programme was given to an

address on the "Forest Interests of New Jersey" by Mrs. Edward D. McCarthy, of Plainfield, who explained in a clear way the different forest conditions which prevail among the mountains in the northern part of the state, in the Pine plains of the south and on the shifting sands of the seashore, together with descriptions of the special beauties and uses of the woods of each region; and then gave convincing reasons for the adoption of a conservative forest policy in each. The history of the steady growth of sentiment in favor of good forestry throughout the country was graphically sketched, and then practical ways were pointed out in which women could reinforce the propaganda. Work was suggested through schools, libraries and public discussions; by offering prizes to school children, and having in every district exhibits of maps and photographs illustrating the results of wanton forest destruction and scientific forest management; by joining forestry associations; as clubs and classes by taking up a systematic study of the forest in its economical aspect and, more than all, by the cultivation of a sympathetic love of trees and of natural beauty and order out of which will grow village improvement societies with forestry committees and the like. There is no doubt that Mrs. McCarthy was justified in the statement that if the women of New Jersey took hold of this matter in earnest, "within a year a State Forest Commission would be organized, a radical and practical fire policy would be so enforced throughout the state as to save the remnants of our forests, and courses of instruction would be founded which would teach us to value them and use them aright."

In connection with this address, and illustrating it, was an admirable exhibition in an adjoining chamber. This consisted of a series of maps, showing the forest reservations in the west and the forest area of New Jersey; large photographic views of the Palisades, in which nature and nature's defacement were contrasted; views to show the desolation wrought in various parts of the country by criminally careless methods of lumbering; pictures of the expensive engineering work in southern France, made necessary by stripping the mountains of their forest cover. Besides these, pictures of noteworthy trees and attractive landscapes and the instructive leaf charts of Grace Anna Lewis were disposed in an artistic way about the walls, while on the tables were pamphlets on tree-planting, forestry and village improvement, sample copies of periodicals devoted to forestry, a sheet for the registration of names of all who wished to enroll themselves as taking an interest in the subject, and a circular for distribution containing a brief list of books relating to forestry, village improvement and rural life. The arrangement of this exhibit was so effective that it seemed a pity that it must be transient, and the suggestion that every library and schoolroom should have something of this kind as a general help in the education of public sentiment was felt by all who saw it.

What Would be Fair Must First be Fit.

A CONSTANTLY increasing number of Americans are desirous of securing some measure of beauty in the surroundings of their every-day lives. These people are not content with things as they are. They want more and more of pleasantness in and around their own houses and about their village, town or city as well.

To these earnest and inquiring people come a numerous company of writers and would-be missionaries, who, however, preach strangely differing gospels. First to appear are the gentlemanly agents of the commercial nurserymen. These bring many books of pictures of more or less lovely and rare plants, shrubs and trees, and say, "Look, you can make your surroundings beautiful if you will plant some of these interesting and lovely things. You ought to screen that ugly fence with Roses, scatter 'specimen ornaments' about your grounds and put a bed of Cannas before your door." Next come the more pretentious

landscape-gardeners, who prescribe curves for paths and other approaches as being more "natural" than straight lines, and then propose plantations to fit or account for the curves. These gentry talk much about Nature and affect to consider formal treatment of ground and planting a sort of profanation. They are of many schools, for some will urge the planting of Purple Beeches, Blue Spruces and all manner of exotics, while others say, "You will do well to use few but wild native shrubs. What can be lovelier than this wayside group of Red Cedar, Bayberry and Wild Rose?" Thirdly, come the modern American architects, whose technical training has been acquired at the Parisian Ecole des Beaux Arts. These hold up their hands in holy horror at the landscape-gardeners of all schools, and say to the inquiring public, "Let us show you how wrong these men are! What you really need to make your surroundings beautiful are straight avenues, terraces and balustrades, a 'rampe douce' at your door and a sun-dial in an old-fashioned garden."

This is no fanciful picture of the strange conflict of modern doctrine concerning beauty in the surroundings of daily life. It is no wonder that the inquiring public is bewildered. Controversial papers and books are continually appearing. Bad language is employed by all parties, but the modern architects appear to be decidedly the most skilled in its use. Such adjectives as asinine, silly and ridiculous are not uncommon in the writings of Messrs. Blomfield, Thomas and Seddings, who, however, are English and not American controversialists.

How absurd all this quarreling seems when once a moment can be obtained for sober reflection. Is beauty, as a matter of fact, often won by following shifting fads or fashions, by heaping up decorations, by gathering architectural or botanical specimens, however remarkable or even lovely? On the contrary, it is by wrong-headed attempts to win beauty in these impossible ways that the ignorant rich and their imitators so often succeed in putting pretentious ugliness in place of simple loveliness and charm; witness the greater part of Newport and many another once pleasing region now sophisticated and destroyed.

Little or no thought being given to the fundamental arrangement of lands and buildings for convenience and beauty, an attempt is often made to retrieve the situation by adding decorations, such as statues, fountains and bridges, or, more generally, a selection from the marvelous products of modern nursery gardens. In those rarer cases where some real attention is devoted to the all-important fundamental arrangement, the design is apt to be strictly limited by the supposed requirements of the particular style of treatment which may be selected. The picturesque, the gardenesque and the formal styles are soberly discussed; but selection is apt to be made according to fancy merely, and the results, as in the first-mentioned class of cases, are generally amusing or striking rather than beautiful. A house scene filled with irrationally curved paths is seldom lovelier than one which is decked with a collection of contrasting specimens. A private country house approached by an unnecessary triple avenue and fitted with steps and terraces broad enough for a state capitol is equally amusing in its way.

The cause of the failure to attain to beauty in these and all similar cases is doubtless the same; it is (is it not?) the common lack of rationality at the foundation.

How is it that so much of the natural scenery of the world is beautiful and that so many myriad kinds of living things are lovely? The fact may not be explicable, but "it is one of the commonplaces of science that the form which every vital product takes has been shaped for it by natural selection through a million ages, with a view to its use, advantage or convenience, and that beauty has resulted from that evolution."

How is it that so much of the humanized landscape of the world is lovely? Is not the same natural law at work here also? The generations who by their arduous labor made

the scenery of Italy, England and the valleys of New England what each is to-day

wrought with a sad sincerity.
Themselves from God they could not free,
They builded better than they knew,
The conscious (earth) to beauty grew.

In New England, for example, the hard-worked men of the last century cleared and smoothed the intervalles, left fringes of trees along the streams and hanging woods on the steep hillsides, gathered their simple houses into villages and planted Elms beside them, for "use, advantage and convenience" merely, and yet beauty is the result. Truly,

this is an art
Which does mend nature, change it rather;
But the art itself is nature.

The moral to be taken to heart by the sophisticated and self-conscious seekers after beauty in our present day is obvious. Success in achieving the beautiful is to be hoped for only when we bow to the law of nature and follow in the appointed way. Special purpose is the root, and fitness for purpose the main stem, of the plant of which beauty is the flower. As William Wyndham wrote to Humphrey Repton, "lands should be laid out solely with a view to their uses and enjoyment in real life. Conformity to these purposes is the one foundation of their true beauty."

Thus, the right planning of the arrangement of lands for private country-seats or suburban houses, for public squares, playgrounds or parks, for villages or for cities, is not a question of "the gardenesque" or "the picturesque," "the artificial" or "the natural," "the symmetrical," or "the unsymmetrical." Whoever, regardless of circumstances, insists upon any particular style or mode of arranging land and its accompanying landscape, is most certainly a quack. He has overlooked the important basal fact that, although beauty does not consist in fitness, nevertheless all that would be fair must first be fit. True art is expressive before it is beautiful; at its highest it is still the adornment of a service.

The modern practitioners of renaissance architecture need especially to be reminded that they have not a monopoly of the lovely. "Symmetry is beautiful, but so, also, is the unsymmetrical relation of the parts to a whole in Nature." Since all natural landscape, save that of the plains and the oceans, is unsymmetrical, it follows that humanized landscape is also generally and fittingly informal. Such landscape properly becomes symmetrical or formal only occasionally and for good reasons. The roads of a hilly park rightly curve to avoid obstacles or to secure easy grades; but a particular spot within that park, intended for the gathering place of crowded audiences at band concerts, is rightly graded evenly and symmetrically and shaded by trees set in rows. Again, the fields and woods of a country-seat are rightly disposed picturesquely, while those outdoor halls and rooms of the mansion called the terrace and the flower-garden are just as rightly treated formally and decoratively. The naturalists are justified in thinking formal work often impertinent and out of place. The formalists and the decorators are justified so long as their work is rooted in usefulness and adaptation to purpose. "Each has its proper situation; and good taste will make fashion subservient to good sense," wrote Humphrey Repton. It is to be hoped that our quarreling faddists may take to heart this saying, and may turn themselves to the advancement of Repton's real and much needed art of arranging land, vegetation, buildings and the resultant landscape for the use and delight of men.

Brookline, Mass.

Charles Eliot.

Salt and Sugar in *Washingtonia filamentosa*.

RECENTLY, while examining this Palm for tannin, I was impressed by the sweet and salt taste of the fresh tissue. Less than one per cent. of tannin was found, but, as the specimen contained 68.97 per cent. of moisture, this raised the amount of tannin to 2.73 per cent. when calculated for absolutely dry substance. The quantity is too

small, however, to give the tree any value on account of its astringency.

Attention was then directed to the sugar content of the specimen with better results, for the amount found, when calculated for dry substance, was 15.50 per cent. Since this amount was not materially increased by first treating the infusion with acid, it was probably a glucose sugar.

The ash in the absolutely dry specimen was found to be



Fig. 16.—*Nymphaea tetragona*.

11.86 per cent, over one-fourth of which was sodium chloride (common salt), the actual amount of salt being 3.09 per cent. of the dry substance of the Palm. The locality in which the tree was grown might have had something to do with the amount of salt present.

The specimen analyzed was a cross-section of the trunk at the base of the leaves, and in the fresh state was sufficiently fleshy to be easily cut with a knife, but in drying it became hard and woody.

It was received through the kindness of Dr. F. Franceschi, of Santa Barbara, California.

College of Pharmacy, Philadelphia, Pa.

Henry Trimble.

New or Little-known Plants.

Nymphaea tetragona, Georgi.

PROBABLY the earliest figure of this small but attractive Water-lily is that of Gmelin in his *Flora Sibirica*, iv., t. 71 (1769). The woodcut which he gives as *Nymphaea alba minor*, although rather stiff and crude, is unmistakably of this plant. Georgi's name, *N. tetragona*, used in 1775 in his *Bemerkungen einer Reise im Russischen Reiche*, i.,

220, is apparently the first published binomial for the species, although from Sims (*Bot. Mag.*, xxxvii., under t. 1525) we learn that Pallas had found the same plant in his Siberian travels, and called it *tetragonanthos*, a name probably unpublished until mentioned by Sims. Both specific names allude to the quadrate form of the floral receptacle or even of the flower itself.

In his *Paradisus* (t. 68) Salisbury named and figured a *Castalia pygmaea*, a native of China. This was later transferred to *Nymphaea* by the younger Aiton as one of his unnamed collaborators (*Hort. Kew*, ed. 2, iii., 293 [1811]), and Sims, who in the *Bot. Mag.*, xxxviii., t. 1525, gives an excellent representation of it, admits in his synonymy that the Chinese plant is identical with the older Siberian *N. tetragona*, to which it is now generally reduced.

Our knowledge of *Nymphaea tetragona* as an American plant is comparatively recent, dating from 1888, when Dr. Morong characterized and figured (*Bot. Gaz.*, xiii., 124, t. 7) as *Castalia Leibergi* what he regarded as a new species from northern Idaho. The types had been secured by Mr. John B. Leiberg in a small pond near Granite Station, on the Northern Pacific Railway. It requires, however, no specialist in aquatic plants to see from Dr. Morong's plate, above cited, that he had before him the flowers of a *Nymphaea* with the pinnately veined leaves of a *Nuphar*. A careful study of some of his type material not only confirms this view, but shows that the *Nymphaea* is identical with the Asiatic *N. tetragona*, Georgi. In 1890 Professor Macoun stated (*Cat. Canad. Pl.*, v., 300) on the authority of Professor Britton that *N. tetragona* had been found in the Misinaibi River, in northern Ontario, by Dr. Robert Bell, and in ponds along the Severn River, Keewalin, by Mr. James Macoun. These plants appear to be the same which Lawson (*Trans. Roy. Soc. Canad.*, ser. iv., 1888, 113) erroneously referred to *Castalia odorata*, var. *minor*.

With our present knowledge of its distribution, *Nymphaea tetragona* (see figure 16 on this page) appears to be rare and local in America, but between its widely separated occurrences in north Idaho and north Ontario future and more careful exploration may well show a number of intermediate stations.

Gray Herbarium, Cambridge, Mass.

B. L. Robinson.

Canna Italia.

ON page 520 of vol. viii. of this journal we quoted from an article by Monsieur Edouard André an account of a new race of what he called Italian Cannas, which had been produced by Messrs. Dammann at their grounds near Naples. It was said that a member of the firm, having concluded that he could produce nothing novel by continual interbreeding of the large-flowered varieties, determined to introduce some new blood and began to experiment with *Canna flaccida* as one of the parents. This species is a native of the southern United States, of medium height, with large flowers, in which one of the petals is specially developed. The first success was achieved from seed of Madame Crozy with a fine variety of *C. flaccida* as the pollen parent. The result was a plant named *Italia*, the flower of which was said to be of unusual size, of a golden vermilion color and peculiarly opened or flattened so as to resemble the flower of Kämpfer's *Iris*. One of the flowers of *Italia* figured in *The Gardeners' Chronicle* was said to have been five and three-quarter inches across.

This new *Canna* has recently flowered with F. R. Pierson & Co., of Tarrytown-on-the-Hudson, and although the color of the flower does not exactly coincide with Monsieur André's description, the plant is certainly most interesting, and the flowers have a singular and striking beauty. An illustration of a truss of these flowers from Mr. Pierson's plant, reduced to less than half the natural size, will be found on page 135. It will be seen that the petals are unusually broad, and that two of the inner ones are held above the three outer ones a trifle, thus producing something of the effect of a double flower. In this arrangement it differs from that of any other *Canna* with

which we are acquainted. The general color-effect is rather yellow than vermilion, the outer petals being almost entirely yellow, with a pleasing shade of carmine at the centre, and the inner ones almost entirely carmine, with a narrow margin of yellow, while a distinct satiny lustre adds to the richness of the combination. The flowers when fully open are about six inches across, larger than those of the best of the American seedlings. Perhaps the truss will not be as large and full as those of some of our seedlings, but the second trusses of Mr. Pierson's plants were considerably larger than the one in our illustration, and held well up on a long stem. The flowers of *Canna flaccida* are rather frail, and it is therefore possible that this hybrid may lack substance, but this is only conjecture, as it has not yet been grown here out-of-doors. The foliage is a light green, and the plant seems to be of taller habit than most of the Crozy seedlings.

Plant Notes.

North American Plums.

THE value of some of the North American Plums as ornamental plants is hardly appreciated yet by the planters of parks and large gardens. Of the species of the eastern and northern parts of the country the Canada Plum, *Prunus nigra*, is the earliest to flower; this is a tree which, under favorable conditions, occasionally attains the height of thirty feet, with a short stout trunk separating into a number of upright ridged branches armed after their first year with short, lateral, spur-like branchlets. The fragrant flowers appear in New England late in April or early in May, before the leaves, and completely cover the head of the tree; they are about an inch and a quarter across, with pure white petals, which turn reddish purple as they fade, and are borne on slender dark red pedicels. This is the native Plum which is so often planted as a fruit-tree in Canadian gardens, and is sometimes found naturalized by roadsides in northern New England, where it is supposed to have been introduced by the Indians.

Even more beautiful is the Wild Plum of the middle states, the *Prunus Americana* of botanists, which is distinguished from the Canada Plum by its long, slender, pendulous branches, which form a wide, graceful head. This tree does not expand its flowers until after the petals have fallen from the Canada Plum, and the flowers are smaller and often do not fade until after the young leaves have begun to unfold. A well-grown specimen of this tree covered with flowers is an object of extreme beauty, and the only objection to it is the rather disagreeable odor which the flowers emit. Left to itself the Canada Plum produces numerous suckers, so it is usually found in dense broad thickets of many stems, but with the aid of a little judicious pruning and attention it can be made to grow into a shapely tree, often more than thirty feet high. It is most ornamental, too, in early autumn, when the branches are borne down with its abundant crops of small fruits, which, after they have attained their full size, are orange-color, with bright cheeks, later becoming bright red.

Very useful, too, as an ornamental plant is the Beach Plum, *Prunus maritima*, which, in cultivation, grows to a much larger size than it often attains in its home, close to the sea; as a garden plant this shrub covers itself early in May with innumerable small white flowers, which wreath the branches from end to end and have the merit of lasting in perfection for a considerably longer time than those of many other Plum-trees. The fruit, too, varies much in size, in edible quality and in color, being occasionally a clear amber, instead of the usual purplish red.

These three Plums can be easily raised from seeds; they grow rapidly and are perfectly hardy and not very particular about soil. Among the early-flowering trees in the shrubberies of the Arnold Arboretum none have excited so much admiration during recent years as a number of large specimens of *Prunus Americana*, which flower with remarkable profusion.

Cultural Department.

Cyclamens from Seed.

THE Cyclamen may be grown to perfection in an ordinary window without bottom-heat, and with as little trouble as would be given to a seedling Geranium, and those who never have grown it from seed have no idea of the ease with which it may be brought to flowering size. Success with these plants is possible if a seed is put here and there in the soil where other window plants are growing, and the young seedlings are removed as soon as they are large enough to bear transplanting.

If it is desired to bring the plants to blooming size as early as possible, the seed should be sown as soon as ripe—which will be in late winter or early spring—in shallow seed-pans or boxes, in a soil composed of leaf-mold, well-decayed stable-compost, and somewhat coarse sand in about equal parts and thoroughly mixed. Glass may be laid over the top of the box to assist in keeping the surface of the soil moist. The seeds will germinate in from fifteen to twenty-five days. The first leaves are nearly round, dark green above and of a dull reddish hue on the under side and cannot easily be mistaken for anything else. The later leaves are heart-shaped, and are mottled or marked on the upper side with grayish green.



Fig. 17.—Hybrid Canna Italia—reduced.—See page 134.

As soon as the seedlings have made the third leaf they should be transplanted into other pans or boxes of similar soil, disturbing the roots as little as possible, and they may be moved again, if necessary, before September or October, when they should be placed in the pots in which they are to bloom. The seedlings should have plenty of light, but when

young they should be shaded from the direct rays of the sun. The bulbs should be set with the crown or upper part even with or a little above the surface of the soil. In all transplanting or repotting of this bulb the roots must be disturbed as little as possible.

For the first six months the bulbs grow slowly, but afterward they increase in size more rapidly, and will bloom—if it is their season of bloom—when about one inch in diameter; and will increase in size and blooming power as they grow older. A mature bulb, say three inches in diameter, will bear hundreds of flowers in a season, producing from twenty-five to fifty at once, and continuing to bear thus lavishly for about three months each season.

The Cyclamen comes into flower in January or December, though seedlings at their first blooming season may be somewhat later than this, and they will bloom if they have been well cared for when a little less than a year old. The plants require considerable moisture, but the soil should not be kept wet,—that is, not saturated with water. Excessive moisture would be fatal to the seedlings. Neither must they be allowed to become dry, or their growth will be checked. They do not require great heat. An even temperature of about sixty degrees will produce the best results. During the summer the seedlings may be kept upon a porch, or on the north side of the house where they will get the morning sun only. They should be washed or sprayed occasionally to keep down the red spider, which sometimes attacks them.

The plant has a neat, dwarf habit of growth, and bears its flowers, which are white, pink bluish, red, or striped and mottled, on slender stems well above the foliage. After blooming, the bulbs require a season of rest, and water should be partially, but never wholly withheld, until it is time to repot them, in late summer, for winter use.

This plant is best propagated from seed, though some have succeeded in growing it from large leaves. The stem of the leaf is placed in water in a sunny window, and after a time a small bulb may form on the end of the stem, which is then transferred to suitable soil and treated as a seedling.

Seedlings do not always resemble the parent plant in the color of their flowers, and often new and valuable varieties are produced. It is this element of chance that helps to make the growing of bulbs from seed such a fascinating pastime.

Considering the number of its flowers the Cyclamen does not seed freely. When the seed is ripening the stalks bend or curl down until the seed-pod rests on the soil.

South Kankama, Wis.

Beth Day.

Hippeastrums.

SOME new Hippeastrums, now in bloom in the greenhouses of H. H. Hunnewell, Esq., Wellesley, Massachusetts, are remarkable for immense size and fine coloring. They came from Messrs. Veitch, of London, and the selection being left to them there is no doubt they represent the highest attainment of the hybridists' art up to this time. They are certainly great improvements on the older kinds. These novelties are altogether free from the green lines and reticulation on the petals so commonly seen in the earlier hybrids. Messrs. Veitch grow their plants in houses specially constructed for them. They are potted or top-dressed, as need be, immediately after the flowers fade. They are continued in a fairly high temperature, with abundance of water—manure-water alternating frequently, until the annual growth of leaves is fully matured. After this less and less water is given; but it should never be altogether withheld. The leaves will fade away, but may not do so entirely. Some hybrids remain with considerable green all the year round, and common sense suggests that these have slightly more water. Hippeastrums respond to artificial hybridization so freely that several gardeners hereabout are growing large numbers of them with pleasing results; for while they may get few which come up to the highest standard, there are, nevertheless, many highly decorative varieties which are useful at all times in winter. These seedlings are grown without rest until they bloom. The majority will bloom at two years, but probably the better varieties will need to be grown three years before they flower. Where a special house is provided, cocoanut fibre or litter is used as a plunging material. These imported varieties had made roots over the edges of the pots during last season's growth. In houses specially constructed for them it makes no difference whether the roots are in the pots or outside, for the plants bloom where they grow. With our facilities it is different; where no general collection is grown no special culture can be given.

Hippeastrum Johnsoni is one of the earlier hybrids. Although the flowers are small, by comparison, it is still a

handsome kind. A neighbor who grows it largely for market succeeds well by plunging the deep flats in which he grows them out-of-doors for the summer. This suggests the idea that raising Hippeastrums might become part of the bulb industry proposed for the south. Some few are already offered by Californian growers, but, as far as I have seen, they are quite common kinds. A few of the choicest types should be imported as a basis to work on. My experience with the few I have is that they are hardier than is generally supposed. By an oversight some pans were left out last year until the middle of November. What few leaves remained were cut off at once, but the bulbs were uninjured, and they have flowered well this winter.

Mr. F. L. Harris, gardener of Mr. H. H. Hunnewell, exhibited a collection of Hippeastrums at a recent meeting of the Massachusetts Horticultural Society, and received honorable mention for them. The most noteworthy were Calabar, scarlet, with orange shading and crimson reticulation. The flowers were eight inches across and finely recurved. Olympia resembles Calabar, except that the markings are better defined. The flowers are equally as large, but not so finely formed. Madonna is a most chaste and beautiful variety. It is creamy white, with light scarlet pencillings. The petals are wavy and finely revolute. Fresca is crimson, with maroon lines and reticulation. It is the best of all the dark-colored varieties. The flowers are eight inches across and beautifully formed. Cupid is the gem of the group. The flowers are creamy white, with a heavy reticulation of crimson. They measure six inches across and are finely formed. The habit is dwarf, and the plant bore two large scapes of four flowers each, in a seven-inch pot, showing high culture.

Wellesley, Mass.

T. D. Hatfield.

Seasonable Suggestions.

ALTHOUGH April is close at hand, winter still reigns, and practically nothing has been done in the garden. We might attempt some pruning, but, with the exception of Grapevines, which should be pruned before the frost leaves the ground, it is better to leave shrubs until the weather is settled. Especially where the ground is heavy, much harm may come from treading on it. Roses of the Hybrid Perpetual kind will need cutting below the frozen growth. In varieties such as La France and other hybrid Teas it is best to leave on as much sound growth as possible, and Paul Neyron, Ulrich Brunner, Marie Baumann and the majority of sparsely thorned varieties also. As a rule, the heavily thorned varieties will bear harder pruning. The Prairie Rose, Scotch, Persia, Dawson and rambling Roses, such as the Multiflora group, need no more pruning than is required to clean off decayed growth. Hydrangea paniculata and all other flowering shrubs which bloom on the current year's growth may be spurred well in, and Yellow-barked Willow and Red Dogwood will be brighter in the autumn if pruned yearly; but spring-flowering shrubs should not be touched until past blooming, beyond clearing away dead growth, and, in fact, this is all that is necessary at any time. Climbing plants need looking over and bare spaces covered. Wistarias which have covered their allotted space should not be allowed to develop useless canes. All slender spiny shoots with light-colored bark must be cut away. Clematis paniculata may be cut back to within five or six feet of the ground and tied into shape. This yearly pruning keeps the vines well clothed below, where there would be only congested growth from the live tips. All planting of trees and shrubs should be done early, as drought too often quickly follows the breaking of winter. There should be at least a yard of good loam to every plant, and this can only be counted upon to last a year or two, before the area of deep soil will need extension. If herbaceous borders need replanting or filling from the reserve garden this work must be done at once. The common practice of digging borders in spring is objectionable. It is a work needing extreme care, and is seldom done in a satisfactory way. We only clear away leaves and litter remaining from the top-dressing of manure laid over winter. The rock-garden is still frost-bound and covered with pine-needles, but as soon as practicable it will be cleaned and receive a top-dressing of lawn fertilizer. This mixture we have found to answer perfectly, having discarded barnyard-manure in its favor. The latter carries too many weed-seeds, and as only hand-weeding is practicable, the work of keeping the place clean is quite tedious.

Spring-bedding must be prepared for. Pansies, Forget-me-nots, Silene pendula and Daisies are used in masses with better effect than in mixed beds. Dutch bulbs have been used, but these are short-lived and seldom satisfactory, as it is hardly

possible to get a perfect bed. Later we have special effects in nooks and corners of the shrubberies, with Foxgloves, Canterbury Bells, Sweet Williams, Larkspurs and Hollyhocks.

Wellesley, Mass.

T. D. Hatfield.

Dendrobiums at the Harvard Botanic Garden.

DENDROBIUM SECUNDUM deserves mention as the most distinct species of this showy genus, in bloom here at present, although its flowers are not as gorgeous or as delicate in color as those of many other species. It is an erect plant, its stoutest stems being about twenty inches high and three-fourths of an inch in diameter. The young stems of last summer's growth are clothed with ovate leaves three or four inches long and an inch and a half in breadth. The flowers are produced in racemes, are four inches or more in length, from the upper part of the leafless one or two-year old, or even older stems. The small rosy purple flowers, about fifty or sixty in number, are arranged thickly along one side of the rachis. The sepals and the slightly smaller petals are ovate, the lip a lighter shade of color than the other parts of the flower, with an orange blotch at the apex. The spur is long and rather broad and blunt. A plant carrying several racemes is very striking, and, although the flowers are small, they last in good condition for several weeks. It does well planted in a pot, using fern-root and sphagnum as a compost. During the summer it is grown in the stove, and when its pseudo-bulbs have grown their full length water is withheld by degrees and it is shifted into a cooler and drier house, suspended near the roof-glass, and with only enough water to keep it from shriveling. When the racemes begin to show on the upper part of the stems it is taken back and treated more liberally. If it needs shifting into another pot this is done after the plant has flowered.

Another distinct species in bloom now is *Dendrobium aggregatum*. It is a dwarf evergreen plant, growing some four inches high, with oblong-ovate pseudo-bulbs two inches in length. The loose pendulous racemes of yellow flowers, produced from the side of the pseudo-bulb, are six inches long, and made up of ten or twelve flowers. When the plant blossoms well the light and graceful racemes hide the sides of the basket. The flowers are golden-yellow when they open, but in a few days they turn to an orange-yellow. This *Dendrobium* is usually cultivated on a bare block of wood, but here we grow it in a small shallow basket, using fibrous peat for a compost. It is kept during summer in the warmest house and needs liberal watering and frequent syringing. When the pseudo-bulbs are full grown less water is needed, and late in the fall it is removed to a cooler house, where it rests until the flowering season. With the above treatment it produces an abundance of flowers every year. It was introduced into English gardens from India more than sixty years ago.

The handsomest yellow-flowered *Dendrobium* in bloom is *D. fimbriatum oculatum*. This is a strong upright grower, its long cane-like pseudo-bulbs attaining a height of nearly three feet. The upper half of the stout stems when young is clothed with green leaves, which are six inches long. The flowers are produced from the ripened stems in drooping racemes, which contain from half a dozen to a dozen blossoms. The individual flowers measure two inches or more across and are of a rich orange-color, with a deep maroon-purple spot at the base of the lip. The lip is the most conspicuous part of the flower; it is margined with a deep golden-colored fringe. If the flowers are kept dry and not too much moisture in the house they last two or three weeks. This *Dendrobium* is planted in a deep basket in fern-root and sphagnum and suspended near the roof-glass. When it is making its new growth it requires stove-heat and abundance of water. After it has completed its season's growth it requires to be kept dry and in a slightly cooler temperature until it begins to show flowers.

Dendrobium superbum is a fine species, easy to grow and flowers freely every spring. It does best in the stove, in a basket suspended near the roof-glass during the summer months. After it has completed its growth it needs a good rest in a slightly lower temperature, and in a position where it can get all the light possible. This is a strong-growing, drooping, deciduous plant, and has stout pseudo-bulbs nearly a yard long, with oblong lanceolate leaves five inches in length. The pale purple flowers are large, measuring three to four inches across, and are produced in pairs from the joints of the new growth. They last well and the plants are handsome for some time.

Some of our plants of *Dendrobium chrysanthum* are in bloom now, but on a number of them the buds are just beginning to show on the long pseudo-bulbs. This *Dendrobium* is treated differently from the other species mentioned in these

notes. It is grown in the stove the year round, as it rejoices in heat and moisture. When the pseudo-bulbs have finished growing less water is needed, but at no time is the water withheld long enough to permit the compost to become quite dry. It is one of the easiest species to grow when properly treated. Some of the pseudo-bulbs are nearly four feet long and a mass of golden flowers. The only deficiency the plant has is that its flowers do not last long. It does best when grown in a basket suspended from near the roof, where its long graceful stems will show to the best advantage. The beautiful golden-yellow flowers are produced on the young leafy stems and they measure about one inch and a half across.

The most useful and the best-known species is the old *Dendrobium nobile*. Even the smallest collection can boast of plants of this handsome Orchid. Among a number of plants of this showy species in bloom here, the variety named *D. Sanderiana* stands out conspicuously and seems one of the most distinct. It has magnificent flowers, large and very brilliant in color.

Botanic Garden, Harvard University.

Robert Cameron.

Caladiums.

IT is not surprising that bulbs and other tuberous-rooted plants occupy so prominent a place in decorative gardening, for without these there would be a great loss of decorative material. Plants which accumulate nutriment for another year in bulbous or tuberous roots can be stored away during their resting season in a very small compass, and the advantage of this is obvious. It is necessary to prepare each year for considerable summer decoration, and at the same time provide space in the greenhouses for the growing of cut flowers. No plants are more useful for summer decoration than the fancy-leaved *Caladiums*. There has been quite a revolution in this class of plants since their cultivation was taken up in Brazil by skilled operators under the best possible conditions. At the World's Fair in Chicago an education was afforded by the fine examples of *Caladiums* seen there, and which showed brilliant colors and excellent cultivation, the fine effect being obtained in but a few weeks and continuing throughout the season. The newer kinds, to that time practically unknown to us, were made familiar, and these are no more difficult to grow than the older kinds of less brilliant coloring. We have fairly tested this new Brazilian set of *Caladiums* for several seasons. The cost is reasonable, and they are very effective. A set to be found in English nurseries surpasses them in one respect, that of dwarf habit. I am told that this habit was brought about by crossing the larger high-colored varieties with the dwarf red variety *Caladium minus erubescens* that we grow as a companion to *C. argyrites*. The resulting progeny is superb in coloring, dwarf in habit, and excessively high in price at present, but some day we hope they will be obtainable. Among other things we have noticed that the varieties that have foliage of pale color and thin texture, often without a trace of green in their composition, are also very sensitive to sunlight, and practically of no value for general decoration such as we need for terrace or piazza, and are of little use except in the greenhouse, owing, perhaps, to the lack of chlorophyll. But as conservatory plants they are very beautiful; the transparency of the leaves, through which it is possible to read a newspaper, gives them interest in a collection. The varieties of higher color are all that one could desire, and there are, I think, as many as sixty in all. We had the set complete at the start, but many of them were practically identical, and more were undesirable owing to the dull tints, and the original number is reduced consequently. But the distinctive character of the collection is due to the influence of this Brazilian strain. It is to be desired for us that are not Portuguese scholars that the raiser in future give to his infants names that could be pronounced by an Anglo-Saxon tongue. I shall not attempt to put the names in type here, for they can be seen at a glance in lists of *Caladiums*, and there is the consolation that the plants are at least as distinct as their nomenclature.

A few remarks about their cultivation to those who wish to try them: *Caladiums* are distinctly tropical, being found directly under the equator, and cannot be treated to too high a temperature, as we understand this particular in greenhouse work. It is in the manner of resting the tubers that many fail, but we always shake the tubers out of the pots in autumn and place them in the warmest part of the boiler-room, each kind being provided with a new label and placed in dry sand in small pots, or in such as are large enough to accommodate the tubers. In this way a large number may be stored in small space without the loss of a single individual, care being taken

when they are shaken out to clean all decayed portions away and to rub on a little charcoal-dust if there is any sign of decay. Since we have taken the precaution to place a handful of sand under the tubers at potting-time they have almost entirely escaped from the rot that used to give a great deal of trouble at their bases. To be of the most use to us *Caladiums* must be started early in the season, so that they shall be well grown in the early summer months and the foliage well developed and in a condition to stand exposure at that season. We start them early in the year for this reason, and this makes it possible to store them away under the benches at the time in fall when all plants must be got under glass, and the space occupied by a collection of *Caladiums* is needed for winter-flowering plants. This early start, therefore, gives us a twofold advantage. But those who have not a warm house commanding at least a temperature of sixty-five at night had better wait until later in spring, when it is attainable, for a good brisk heat is necessary to get a free growth of large well-colored foliage. *Caladiums* like a light rich soil. We add a large proportion of spent mushroom-bed material to a compost of leaf-mold and loam, made porous with plenty of sand, and later in the season, if necessary, liquid stimulant is given. The aim is to produce the greatest leaf-development, and, on the whole, it is easy to accomplish.

I am glad to find that there is an operator at work in Florida on this family of plants, and we have now in course of trial some two dozen or more varieties raised in that state, where they thrive outdoors with great vigor. It is not too much to expect that we may have in the near future a race of American *Caladiums* equal to those we have hitherto received from abroad.

South Lancaster, Mass.

E. O. Orpet.

Plants for Conservatory and Window Garden.

Chorozema ilicifolium.—This elegant leguminous plant bids fair to become one of the most popular of its class. It forms a dwarf, globular bush when well trained, producing numerous few-flowered racemes of bright yellow flowers, tinted red, from March until late in summer. The leaves are about an inch long, dark green and leathery, with wavy, spiny-toothed edges, not unlike Holly leaves, but smaller. The branches are very slender; young plants should, therefore, be well pinched in order to form compact specimens. The variety "nana" is naturally dwarf and compact. The genus contains several other extremely showy and attractive plants, all of which flower later in the season than the preceding kind. One of the most beautiful of these is *Chorozema cordatum*, a species not uncommon in cultivation; the flowers are yellow, with reddish keel and produced in great abundance in drooping racemes; the leaves are cordate and spiny-toothed. *C. Henchmannii* is a rare scarlet-flowered species with acicular, spiny-pointed leaves. It flowers early in summer. *C. diversifolium* is a very showy plant with bright orange-colored flowers in numerous nodding racemes late in spring. *C. varium* has erect racemes of bright red and yellow flowers and cordate, somewhat spiny, leaves. The *Chorozemas* are easier to grow than most other New Holland plants; they will thrive in any moderately light and warm greenhouse or conservatory. In the conservatory they may be trained on pillars near the glass, in sunny positions. They are excellent house plants, too, rivaling *Cytisus racemosus* in usefulness for this purpose. Propagation by means of seeds is the simplest method of increasing them. The seeds should be sown as soon as ripe, in shallow boxes, in a compost of sandy loam and leaf-mold, which should be kept in a light but comparatively cool place in summer. The young seedlings must be transplanted early and pinched frequently during the first season. Older plants may be plunged in a cool frame in summer in a half-shady position. In potting the soil must be pressed firmly down around the roots, as a loose potting often proves fatal. Watering and spraying must be carefully attended to in summer, and the roots must on no account be allowed to become dry.

Imantophyllum cyrtanthiflorum.—This is a very valuable and floriferous spring-flowering plant of the *Amaryllis* family. Like the more common *Imantophyllum miniatum*, it has quite beautiful and attractive foliage, the leaves being long, dark green, slightly curving and distichous. The flowers are almost bell-shaped, of a very bright salmon color, produced in large, many-flowered corymbs, on scapes from two to three feet high. This is considered a hybrid between *Clivia nobilis* and the above-mentioned *I. miniatum*. It is best grown in large pots or tubs in which it is allowed to increase and form large masses of foliage. The compost should consist of rich fibrous loam, with a liberal addition of cow-manure and some

sand. During the growing season plenty of water is needed, but the plants should never be allowed to dry as much as *Hippeastrums*, as they are ornamental throughout the year. The roots are fleshy, the plants form no bulbs, but increase readily by means of side-shoots or offsets which may be used for propagation. All *Imantophyllums* form ripe seeds if fertilized, and they may, therefore, be propagated with the greatest ease by this means.

Wellesley, Mass.

T. D. H.

The Climbing Hydrangea.—We often hear complaints that *Hydrangea scandens* is tardy in starting to grow. The usual way of raising it is by layering. Numerous roots push out wherever the shoots touch the ground, in the same way as they do from the English Ivy, but when the layers are severed from the parent shoots and set out by themselves they scarcely grow at all for a year or two. Its near relative, *Schizophragma hydrangeoides*, behaves in the same way. It is becoming the practice to pot the layers when taken from the parent plant, and keep them in frames or in a cold greenhouse for a season; after this they may be set out with more certainty of thriving. Both of these vines are gross feeders, and they should be abundantly supplied with manure, especially when well started. It must not be forgotten that all climbers grow much faster when they are supplied with supports. The Climbing *Hydrangea* needs a rough surface, and when it once attaches itself it grows rapidly. *Decumaria barbara*, a closely allied climber, is not at all like the *Hydrangeas* in habit of growth, but from the start pushes on rapidly. Though a native of our southern states, it is perfectly hardy in Philadelphia and much farther north.

Germanstown, Pa.

Joseph Meehan.

Correspondence.

Ericas as Market Plants.

To the Editor of GARDEN AND FOREST:

Sir,—The festivals of Christmas and Easter are now two events of the first importance to the commercial florists, for at these times the demand for plants, and flowers reaches its highest mark. Especially at the latter festival does there seem to be an almost unlimited outlet, especially as then the range of choice is much greater than it is in the dull weather of the early winter.

Naturally there are many would-be gleaners at the harvest, and every grower at this season exerts himself to produce his specialty in its finest form and greatest abundance. For the modern flower grower for the market is a specialist in very few plants. Competition has driven him to grow only those plants which he best understands and can grow to the greatest perfection or most economically.

Among the choicest plants grown for the market are the *Ericas*, or Cape Heaths, but often sold in the city shops as Scotch Heather. Not so many years ago Heaths were driven out of private greenhouses by the Orchids, and those beautiful plants are seldom or never seen in collections. As is well known, they require cultural skill of a high order, and only the softer-wooded kinds are now grown as market plants by a few specialists. Among the best growers of these plants in this locality is Louis Dupuy, a young Frenchman, whose houses are located on a warm southern slope in Whitestone, Long Island. There I found the other day Heaths in all stages, from cuttings to three-year-old plants, the mature ones ready for the Easter market in hundreds and, perhaps, thousands. Judging from the health and thriftiness of the plants here one might suppose them as easily grown as *Geraniums* if he did not know to the contrary. Like all good growers of plants, Mr. Dupuy has no cultural secrets. Learning his business on the Continent, Mr. Dupuy found, in undertaking the culture of Heaths here, that, like many other plants, they required different treatment in their environment, and he has broken away somewhat from the traditional practice so rigidly adhered to abroad. In the first place, they are potted in none of the fancy soil mixtures usually recommended in the books, but simply in good light soil, with plenty of sand, the local article, in fact. Of course, the successful culture of Heaths is a matter of careful, unremitting attention as to air and watering. I suppose the secret of Mr. Dupuy's success may be summed up in the sympathetic culture of each plant as an individual. I learned, also, that a light greenhouse is a poor place for Heaths. According to Mr. Dupuy's experience on both sides of the ocean, he gets as much growth from a cutting in one year here as is secured abroad in two, and his two-year-old plants are as large as European ones at three years old. The one-year-old plants here were very bushy and about nine inches

high, and in four and four and a half inch pots. This is the most popular size. Those unsold are cut down after flowering and grown on in six-inch pots, and make plants about eighteen inches high and as much through. This, of course, refers to the varieties now in flower, which are mostly *Erica persoluta alba* for white, and *E. Mediterranea* for pink. For Christmas there are grown here *E. Wilmoreana*, one known as *E. nigra* and *E. gracilis vernalis*. Even earlier there is a form of *E. gracilis autumnalis*, a favorite English variety. There were a few plants of *E. cylindrica* just coming on, which have large tubular corollas of a beautiful coral-color. According to recent investigations, Heaths and a number of plants naturally growing in soil rich in humus have their roots much modified, and flourish most successfully when their roots are covered by fungoid growths. This is given as an example of most important plant association, or the so-called symbiosis, as the mycelium of the fungus is said to act as the absorber of nutriment from organic matter instead of the usual root-hairs, which fail to develop in such cases. It will be noticed that Mr. Dupuy's potting-soil is not favorable to fungal development, but I brought a specimen plant away for examination of the roots. Under a microscope of high power it was seen that no parasites infested the roots of the plants, and the root-hairs were very abundant. This proves nothing against the scientific theory, but it does seem to prove that the *Ericas* have an adaptability not always suspected, and will grow perfectly in what might be considered unnatural conditions. The same painstaking care shown in the culture of Heaths was evident in all the plants on the place. There were fine dwarf plants of *Hydrangea Otaksa*, well-grown Lilies, *Genistas* (*Cytisus*), *Azaleas*, *Spiræas*, Daisies and a number of beautifully flowered *Acacia armata*, a plant of great distinction, leading to covetousness. Mr. Dupuy also grows Carnations and hybrid Roses—Ulrich Brunner at the moment. Sweet Peas were grown cleverly in pots, a device rather novel, but useful, as they can be shifted about as space permits when the plants now crowding are cleared out.

Elizabeth, N. J.

J. N. Gerard.

Farming on Vacant City Lots.

To the Editor of GARDEN AND FOREST:

Sir,—On reading your editorial on the cultivation of the vacant lots I was struck with the humanitarianism and practicality of this plan to help the now almost helpless poor. Apart from scientific aspects of the case, with which GARDEN AND FOREST chiefly has to do, the economics of such questions, particularly the relation of men to the soil, is a matter of supreme importance, on a proper adjustment of which the weal or woe of a country largely depends.

This might be illustrated by the almost uniform prosperity of settlers in new countries, where civilization barely begins, but where land is easily accessible, contrasted with the constantly recurring seasons of depression in the more densely settled countries where civilization attains highest development, but where land is not to be had except at exorbitant prices.

I would, therefore, urge the further discussion of this matter in the hope that, by a free exchange of opinion, a simple and, therefore, practicable plan may be evolved whereby the needy masses may be enabled to get access to the idle lands on terms which, without recourse to charity, will afford a proper recompense for their labor, security for their crops, and work no injustice to the owners of legitimate investments.

New York.

Luther G. Sand.

To the Editor of GARDEN AND FOREST:

Sir,—Your editorial, "Farming on Vacant City Lots," is timely and interesting. The educational side of the scheme has a special interest for me, but chiefly in its politico-economic aspects, for it will help to explode Malthusian fallacies about overpopulation, restricting immigration, regulating hours of labor, limiting apprenticeship, and the like. The earth is large enough and fertile enough for ten or twenty times its present population, and the bringing together of idle hands and idle lands will alleviate this horrible poverty that festers in our great cities.

The assertion that "anybody who wants work can find it" is utterly false; I have "been there" myself. The Detroit plan proves that a large number, at least, of the very poor will work if they are given a chance at the land. This opportunity will be worth infinitely more to them than all the charity that wealth can offer. It will put them on their mettle and infuse into them the independence of true manhood.

Brooklyn, N. Y.

Stephen Bell.

To the Editor of GARDEN AND FOREST:

Sir,—It seems to me that had the writer of the editorial in GARDEN AND FOREST given the same careful thought to the suggestion regarding the cultivation of vacant-lot gardens that has generally marked the discussion of technical subjects in that paper, his conclusions would have been different.

There is danger in this proposal; the scheme in my opinion is the entering wedge for land confiscation. Let the masses once realize that with free access to land they can make their own living; give them that free access in the name of charity, and it will not be long before the philanthropic features of the case will be forgotten, and access to land will be demanded as a matter of right, and questions of title between the state and the individual will be subjected to the same remorseless scrutiny and review as similar questions between individuals are decided now.

You see the danger to property owners? Even now the right of the landlord to ground-rent is being questioned, that right which may be roughly defined as a privilege to appropriate a part of the earnings of the labor which must use the land. Suppose lot owners allow the use of their land for a few years without recompense—in other words, charitably donate the rent to their tenants—a time must necessarily come when rent will have to be collected or the lots vacated. Is it likely that the people who have "squatted" on the property for years will pay or quit without trouble? Besides their unwillingness to give up part of their earnings to the landowner, is it not probable that their husbandry, presupposing it successful, will have created a powerful public opinion antagonistic to the landowners, as such?

While it cannot be denied that some beneficial results have to be credited to the experiment at its present stage, there can be little doubt that these are due to exceptional circumstances. I believe it is not claimed by its originators that the "potato-patch plan" is a panacea; and their moderation in this respect is justified by every feature of the case. Nothing short of renting the land at a fair valuation will enable the tenants to maintain their self-respect; and in case advances are made for seeds, living expenses, etc., the security usual in such cases should be given to the lender. No other plan will meet the exigencies of the case and remove all fear in the future of a dangerous spirit of independence among the classes whose necessities are now the object of philanthropic solicitude.

New York.

Gregory Smith.

Exhibitions.

Boston Flower Show.

AT the exhibition of spring flowers given in Boston last week by the Massachusetts Horticultural Society the three most interesting features were, first, a collection of Persian Cyclamens from the gardens of Mr. N. T. Kidder, of Milton. The plants were exceptionally well flowered, with abundant foliage and large clear-colored flowers of good substance. Better-grown and more beautiful plants, perhaps, have never been produced, although a large and evenly grown collection of the same plants were shown by Mrs. B. P. Cheney, of Wellesley. Second, a plant of the Japanese Crimson Rambler Rose, two years from a graft, grown by Mr. Jackson Dawson, of the Arnold Arboretum. The plant was five feet six inches high and almost as deep through, covered to the pot with healthy foliage and with more than a hundred clusters of flowers. Whatever may be said of the beauty of this variety, which some people think less attractive than the single white-flowered *Rosa multiflora*, from which it has sprung, or than the hybrid Dawson Rose, this specimen shows its possibilities as a pot-plant for winter or spring decoration. The flowers are of a glowing color, which outshone that of the Indian *Azaleas* near it, and under electric light it was still more lustrous. The society's silver medal was awarded to this plant. The third striking feature was a well-grown plant of the Australian *Acacia Drummondii*, about eight feet high and five or six feet through, exhibited by Dr. Charles Weld, of Brookline. This also received the society's silver medal. Other noticeable exhibits were the Catherine Mermet Roses shown by Mr. William H. Elliot, of Brighton, and the fine hybrids by David Nevins, of Framingham, and a collection of hardy shrubs forced at the Bussey Institution and exhibited by Mr. Charles Dawson, who is exceptionally successful in the management under glass of early spring hardy flowers. Among these were *Andromeda Japonica*, *A. floribunda*, *A. polifolia*, *A. speciosa*, *Daphne Cneorum*, *Leucothoe Catesbæi* and a peculiar Gorse, *Genista Germanica*.

Notes.

The *Ceylon Forester* gives the dimensions of a Banyan-tree at the Admiralty House at Trincomalee, the girth of whose central trunk is nineteen feet six inches at three feet from the ground, the full height of the tree being sixty-six feet and six inches, and the circumference of the circle shaded by its foliage being 541 feet.

At the recent meeting of the Massachusetts Fruit-growers' Association at Worcester it was stated that the canning of good apples was constantly on the increase in obedience to a steadily growing demand for them, especially abroad, Great Britain alone last year having taken 20,000 dozen. The canned product is so attractive that the demand for evaporated apples is diminishing.

Some experiments made in Belgium recently tend to throw doubt upon the truth of the assumption that insects are guided to flowers by the brightness of their colors. Brilliantly colored Dahlias were covered so as to expose only the disks, and butterflies and bees sought these flowers with the same eagerness and frequency as those which were fully exposed. The conclusion by Plateau was that the insects are guided more by their sense of smell than by their perception of the bright colors.

A Buffalo correspondent writes that he finds *Linum* (*Reinwardtia*) *trigynum* one of the best of the few window plants which flower in early winter—that is, before ordinary bulbs are brought forward. Beginning with the last of November the *Linum* will rival the Chinese Primrose in profusion of bloom, and if the two are placed together in a cool window where the temperature is kept above actual freezing the golden yellow flowers of the *Linum* will appear to admirable advantage among those of the Primroses, and both will keep on flowering until late in February.

Mr. Joseph Meehan writes to confirm what we have stated about the shy way in which *Magnolia Kobus* blooms when young. He speaks of a beautiful specimen in Germantown with a trunk four feet in circumference at a foot from the ground, just below its separation into several large limbs. The tree is twenty-two feet high, with a spread of twenty feet across, and very symmetrical in shape. This tree has flowered as yet but very little, although it is doing so more freely every year. Large as it is, he thinks it carries no more than a hundred flower-buds this spring, while a tree of *M. conspicua* of the same size would have thousands. The flowers are not large and the buds at present are not more than one-third the size of those of *M. conspicua*.

Green peas have recently been shipped from Florida in comparatively large quantities, this vegetable, with mint, being in more especial demand as an accompaniment to spring lamb. Seventy-five cents a half-peck is the current price. Tender and fresh-looking string-beans, also from Florida, sell for twenty-five cents a quart, and some late okra, from Louisiana, costs ten cents a dozen. But little cauliflower is coming from Florida, and the dependence has been on the California supply, which finds ready sale at twenty-five cents a head, a limited quantity from France selling for sixty cents. Boston hot-house cucumbers sell at fifteen cents each, and mushrooms from Long Island and New Jersey at ninety cents a pound. Large stalks of asparagus, as fine as any grown in northern gardens later in the season, are now coming from South Carolina, and sell for sixty-five to ninety cents a bunch. Egg-plants from Florida and Cuba cost twenty-five to thirty cents each, and celery, from Florida and California, \$1.25 for a dozen stalks. Beets are coming from Florida and the Bermudas, and other field crops arriving from these islands are kohlrabi, carrots, onions, potatoes, parsley and Romaine lettuce. Tomatoes from Florida and Key West cost twenty-five cents a pound, and the near-by hot-house product thirty-five to fifty cents. Other new-crop vegetables now in market are white squashes and cabbage from Florida, and lettuce from Florida, Louisiana and South Carolina. Some of the first-class fruit and vegetable stores now include in their varied stock yams, from the Bahamas. These rough-skinned, irregularly shaped tubers find not a few curious purchasers, fifteen cents a pound being the price asked for this popular food of the West Indian negroes.

The sales of cut flowers during the Lenten season, which closes with this week, have been more satisfactory to the dealers than in former seasons, and informal dinner and theatre parties have made considerable demands until now, in Holy Week, when but few flowers are sold. While there have been not a few muggy days during the weeks when plants and

flowers have been forced for Easter, the weather, altogether, has not been unfavorable, and the quality of flowers is, perhaps, higher than ever before. To growers whose stock is developed to the point of hardening off unless days are now comparatively harmless, though a hindrance to any whose plants are belated in development. The uptown flower-stores began on Monday to receive their Easter stock. Lilies, as usual, are most conspicuously associated with the season, and after these azaleas are most abundant. Acacias are among the most popular plants, as are Heaths, the light-colored *Erica gracilis* and the rich pinkish lavender of the more densely flowered *E. globosa* being varieties frequently seen. Among the newer and rarer offerings of this season are *Asparagus Sprengeri*, luxuriant drooping plants of which, in ten-inch pots, are offered at \$4.00. *Spiraea compacta* is evidently supplanting the old *S. Japonica*, the larger and denser flower-trusses of the former proving much more durable. Genistas are somewhat less generally grown than formerly, due to the fact that the flowers fall so soon, a complaint also made against the still less popular *Hydrangeas*, which are specially susceptible to injury from lack of water. In cut flowers carnations are remarkably fine this season, and it is said by expert buyers that ten good flowers are obtainable this year for one a season ago. Helen Keller is just now the most expensive variety, costing one-third more than William Scott and other standard sorts. In roses, Meteor, Bridesmaid, Bride, American Beauty and Mrs. Pierpont Morgan are the favorites in this order, and Baroness Rothschild, Merveille de Lyon and extra-fancy buds of American Beauty have a demand of their own at prices as high as \$18.00 a dozen. The greatest novelty is, perhaps, Moss Roses, dainty plants appearing in one of the Broadway window displays, while small sprays, each carrying a delicate bud, are more frequently seen. Sweet peas, lilacs, Poet's narcissus, forget-me-nots, gardenia and Cape jessamine appear in all the collections.

Firm, well-grown and richly colored strawberries are now quite plentiful, a well-packed quart box costing sixty-five to seventy-five cents, while the more delicate berries from hot-houses near Hackensack, New Jersey, cost \$1.50 for the same quantity. Grape-fruits from Jamaica, carefully carried over in cold storage, bring fifty cents each, and selected Navel oranges from California sell for \$1.00 a dozen. New limes from Jamaica, small and not fully colored, cost \$2.50 for one hundred, and the first new-crop Jamaica oranges have already followed upon the old crop. While not fully matured, these are in demand at \$4.50 to \$8.00 a barrel in wholesale lots. A few tangerines are still shown in collections of citrus fruits. Fresh-looking Catawba grapes, covered with bloom, cost so late in the season but thirty-five cents for a three-pound basket, and heavily shouldered bunches of Almerias, with rich pink coloring, sell at fifty cents a pound. The first native-grown Black Hamburg grapes, from Pennsylvania graperies, now command \$5.00 a pound, and large bunches of immense berries of Gros Colman, cut with a piece of the woody vine, are a luxury at the same high price. These come from the Isle of Wight. The staple apples seen in the wholesale markets are Roxbury and Golden Russets, Baldwin, Ben Davis and Greenings, these ranging in cost from \$2.50 to \$4.25 a barrel to dealers. In fruiterers' collections Ben Davis apples sell at sixty to seventy-five cents a dozen, and Newtown pippins at seventy-five cents to \$1.00. A showy red apple, known as Willow Twig in the trade, is of more delicate coloring than the Baldwin and resembles Northern Spy in its crisp and juicy quality. A few bright-cheeked Lady apples are carried over for use in making up fancy baskets of fruits. Winter Seckel, Winter Nelis, Forelle, Easter Beurre, P. Barry and the large Acme pears are offered at seventy-five cents to \$3.00 a dozen. The best shops include, besides fresh fruits, attractive and varied displays of nuts and of preserved fruits. Among many sorts of nuts that may now be had are large Pecans from Texas, American filberts, English cob nuts in their hulls, Paradise and Souari nuts from South America, large Italian chestnuts and the so-called Lychee nuts, besides the commoner domestic nuts, whole and skillfully shelled. The array of preserved fruits is almost endless, and olives of many sorts and sizes, from tiny, bean-shaped Crescents to large oval Queens; maroons, crystallized ginger, crystallized fruits from France, and crystallized semi-tropical fruits from California; layer and pulled figs and the candied product, the familiar Fard dates, besides a section of the stem thickly set with this fruit, each in a fancy box, and dates stuffed with Pecans; German prunes, in pound boxes, costing sixty cents, and large, meaty French prunes, in jars holding two pounds, for \$1.00; Guava and other domestic and imported jellies, including Japanese and Indian preserves, are a mere suggestion of the tempting and wholesome stock.

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Dangerous Enemies of Street Trees.

HOW much the beauty and comfort of public highways, and especially of streets in towns and cities, are increased by a border of thrifty and symmetrical trees can be appreciated by those who have driven under the avenues of Live Oaks and Laurel Oaks in some of our southern towns and cities or beneath the long arches of Elms a century old which can be found occasionally in New England, and yet not one town or city in a hundred, take the country through, is able to show a row of street-trees of any considerable length which are what they ought to be. As we have often explained, mistakes are made at the very outset by selecting short-lived trees like the Sycamore Maple, or those which lack vigor like the European Ash, or others with brittle branches like the Ash-leaved Maple, or Poplars whose trunks are soon riddled by borers. And even when the proper kinds are selected no adequate care is taken to insure anything like wholesome growth by a proper preparation of the ground in which they are to stand, although there is no more excuse for planting a tree in imperfectly prepared soil than there would be for sowing wheat on an unplowed field. If the young tree has abundant food for its roots and room for its branches to spread, and is properly anchored until it gets firmly set, it probably is left unmulched, and therefore exposed to drought and changes of temperature, or it has no guard against the teeth of horses, no opening in the asphalt about its base to receive water, or it is mangled by some ignorant tree-trimmer and its wounds left bare to invite the rot fungus. The hopeless part of the case is that its natural protectors, the people about it, have no affectionate interest in it. They see it languish without any attempt to revive it. They do not consider one who wounds and bruises it a public malefactor.

No doubt, the way to insure satisfactory street-trees is to put the whole business in the hands of a skilled commission. There is no reason why a man should be allowed to select the tree to plant along the street before his house, or to plant it in his own crude way, any more than he should be permitted to build his own sewer or his own sidewalk to suit his personal whims. Where there is a commission of men who understand their work like those

in Washington every tree is inspected before it is planted, so that specimens of even growth and similar shape are secured. They are then scientifically planted and cared for, and, more than that, they are systematically pruned, an operation which street-trees need above all others. Until the planting and care of these trees is considered an important municipal matter, like providing a water-supply, and one which as truly demands expert ability, the trees in our streets will be likely to excite commiseration rather than pride. Reformation in our city practice as to street-trees will come like other reforms, only after a strong public sentiment is enlisted in its favor.

Because there is no such sentiment—that is, because the trees have no active friends—they suffer from another cause which is one of the most serious dangers at present threatening them. Since the increased use of electricity, wires for telephones and trolleys are run through every village and almost every country road, so that no tree which stands on the public highway is out of danger from the axes of linemen. Occasionally some indignant citizen has mustered courage to bring these vandals into the courts, and in some cases exemplary damages have been secured, but the destruction seems to go on unchecked all over the country. In a late number of the *Michigan Cyclist*, Mr. Charles A. Garfield writes that a gang of telephone men utterly destroyed, with no apparent reason, the most beautiful Maple-tree in the southern part of the city of Grand Rapids. It had been trained and pruned into comeliness and had become a delight to every one who passed it, but in five minutes its beauty was destroyed forever. These marauders unloaded poles upon shrubbery and dug a hole for a post in the midst of a group of shrubs by the roadside, and when remonstrated with they replied that they thought this was wild brush which ought to be cleared away. This pole with its weight of wire stood at a street corner, and to make it steady, guy wires were wrapped about a noble Walnut which had been cherished for more than fifty years; its branches were cut and its trunk half-girdled. Professor Beal added that his experience corroborates entirely that of Mr. Garfield. Two fine White Oaks near him had half their tops cut away and the limbs were left where they fell. A thrifty young Elm and an elegant Beech, trees with trunks more than a foot in diameter, had most of the branches on one side cut away and reduced to stubs from one to six feet in length. Reports of this kind come from all parts of the country, and it is time that some associations like village-improvement societies or forestry associations should unite to try their rights before the law.

What is primarily needed in all such cases is a public sentiment which appreciates the value of a tree, for when the use and beauty of these wayside trees are thoroughly understood their owners will defend them as they will any other property. Meantime, the natural enemies of trees are increasing. The imported Elm-leaf beetle has become a pest of the first magnitude, and although we may expect that its ravages will be checked by natural causes after a time, this may not happen until many of our finest trees are killed, for certainly no tree can endure defoliation for several successive summers without loss of constitutional vigor and early death. Science has taught us how to meet these attacks as well as those of the tussock-moth, the bag-worm and other pests of this sort, and the matter has seemed so important that the Division of Entomology of the United States Department of Agriculture has issued a special circular on the subject in advance of a more complete article which is prepared for the Year Book of the department. There is no need of repeating here what has been frequently said about the necessity of spraying, the proper material to use, and the time of application. The serious question to be dealt with is the spraying apparatus, especially where there are large trees which are infested. Hand pumps have been used by the Gipsy-moth Commission of Massachusetts for trees in streets and parks, but since it is necessary to work rapidly to get over the trees just when the remedy will be most effectual a steam

apparatus would be altogether preferable. The most approved apparatus is described, but the special suggestion which will be most valuable for towns and cities is that an old steam fire-engine can be readily arranged for this spraying work among the shade-trees. Indeed, a steam fire-engine without any modification is a valuable aid against many kinds of insects which can be washed from the branches and foliage by the simple force of the water. But in cities of any size a fire-engine is occasionally retired, and a little work by a competent steam-fitter would transform it into an admirable insect destroyer.

If the city authorities refuse to do this work, coöperation by citizens can accomplish much. Private individuals cannot invest in an expensive apparatus for the few trees on their own grounds, and, therefore, combination is essential, and here, as this bulletin points out, is an opportunity for the new business of spraying at a given price for each tree. Mr. W. S. Bullard, of Bridgeport, Connecticut, has constructed several cart sprayers, and during the months of June and July he sprays the trees on the grounds of private individuals and along the streets in front of them under contract, guaranteeing to keep them in fair condition during the season. His work has been directed solely against the Elm-leaf beetle, the only insect of importance in Bridgeport, and last year any one driving through the streets of that city could easily pick out the trees which had been placed under his care. These were green, while others were brown and nearly leafless. Of course, if every owner of property or resident would agree to employ a tree-sprayer there would be no need of the coöperation of the city authorities, but some might be unwilling to do this.

After all, as we have repeated, the ultimate protection of the trees rests upon public opinion, and it is to this end the circular suggests the banding together of citizens in a tree-protectors' league. Last summer one of the Washington newspapers in every issue through the summer contained a coupon reciting briefly the desirability of protecting the shade-trees and enrolling every signer as a member of such a league, pledging him to do his best toward destroying the injurious insects upon the city's shade-trees adjoining his residence. If every household could be made to take a proper interest in this matter the work would be half done. What is needed is intelligent work at the proper time—the burning of the webs of the fall web-worm in May and June, the destruction of the larvæ of the Elm-leaf beetle about the bases of the Elm-trees in late June and July, the picking of the eggs of the tussock-moth in winter and equally simple operations for other insects when they become especially injurious. The subject is one worth the attention of the Agricultural Department, and we hope this paper prepared by Professor L. O. Howard will be widely read and heeded.

In a recent issue of *The American Cultivator*, Mr. J. D. Lyman, of Exeter, New Hampshire, describes a plantation of White Pine made about forty years ago in Enfield, Connecticut, by Omar Pease, one of the colony of Shakers which settled in that place toward the end of the last century. A sandy plain, which had been cropped with Corn and Rye until what little fertility it had ever possessed was exhausted so far as the production of profitable farm crops was concerned, was planted with the seeds of the White Pine. Two quarts of the Pine seed were mixed with rye or buckwheat sufficient to sow an acre of ground, the seed being scattered as if the crop of grain was the only object of the sowing. In this way from year to year, as Pine seed could be obtained, rather more than two hundred acres were sown. After the death of Omar Pease one of his fields, about forty acres in extent, covered with Pines a foot high, was plowed up in the belief that it would produce Rye more profitably than Pine-trees. Nothing has been done to the land since the seed was sown, and nothing has been done to the trees, which now cover something over one hundred and sixty acres. Omar Pease's good work ended with sowing the seeds. Neither he nor any of

his successors have ever thinned the plantation, and Mr. Lyman finds many Pines growing in a space where there should be only one, and his belief is that the trees have made less growth than they would have, had the plantation been properly thinned from time to time. He adds :

In one place, selecting what appeared an average growth, I found ninety trees on four square rods, or 3,600 to the acre. Cutting what I thought an average tree I found, as nearly as I could judge by counting rings in stump and rows of limbs, that the tree was forty-three years from the seed. It was forty-nine feet high and seven inches in diameter at the stump. In another part of the plantation I found eighty-four trees to the square rod, or 13,440 to the acre. An average tree was here 28.10 inches in diameter at the stump and twenty-nine and one-half feet in height ; as it had twenty-seven rows of limbs I concluded that it started from seed about thirty-one or thirty-two years ago. Properly thinned from time to time there would have been of these trees some four hundred to the acre and they would have been about eight inches in diameter at the stump and, perhaps, four or five feet taller. The first trees, instead of being seven inches in diameter, would, by proper thinning, have been about one foot.

It is a prevalent idea, supported by the results of many experiments, that it is a difficult matter to raise White Pines from seed sown in the open ground, the young seedlings of this tree being very susceptible to exposure to the full sun. Omar Pease, by demonstrating that poor, sandy land in New England can be seeded with White Pine as successfully and easily as it can with the far less valuable Pitch Pine, has rendered the country a service, and his plantations can, perhaps, be made to serve a valuable object-lesson for demonstrating the necessity of thinning young White Pine forests in order to secure the largest results in the shortest time.

Proposed Plan for Madison Square, New York City.

ON another page are reproduced the plan of Madison Square, in this city, as it is to-day, and a plan for its rearrangement which was shown at the recent Architectural League Exhibition, by Messrs. Bell & Langton, landscape-architects.

Sixty years ago few buildings, except rural ones, stood north of Union Square, and the area now called Madison Square was an open tract some ten acres in extent, in the centre of which stood a House of Refuge for unruly boys—an altogether neglected and unsightly tract, of which the only useful feature was a little pond used for skating in the winter. When the House of Refuge burned in 1839, efforts were made to improve the place, but nothing substantial was accomplished until the mayoralty of James Harper, between the years 1844 and 1847. This was some ten years before Central Park was thought of, and although Downing had already done some of his best work, he had not yet laid out those urban squares in Washington which first showed American eyes what might be accomplished in this direction.

When studied on paper the plan of Madison Square shows the working of design, not of accident ; yet its treatment is so petty and monotonous, so wanting alike in broad unity, in effective variety and in conspicuous points of interest, that, we believe, few New Yorkers realize that it has any plan at all. When seen from the encircling streets it has a pleasantly verdurous and shady look, and it contains some very good trees, an Elm which stands near its north-easterly corner, opposite the University Club, being the most symmetrical and beautiful tree which New York possesses south of Central Park. But its trees are not properly grouped—they are simply scattered about. Its lack of shrubs permits the surrounding houses to reveal themselves too clearly from all points of view, and deprives it of that charm of mystery, contrast and surprise which may be achieved even within very narrow limits if shrubberies are artistically employed. It affords no proper place for the display of flower-beds, and none for the proper placing of statues. The one virtue of the design is that those who wish to cross the park diagonally may do so with reason-

able directness. And its chief defect is that its many minor paths cut up its lawns so pitilessly that the eye nowhere rests upon a quiet, reposeful stretch of green.

Truly naturalistic schemes of park design are, of course, more difficult to manage well on a small than on a large scale; and they are not as appropriate as others when the architectural surroundings of the pleasure-ground are of an obtrusively urban sort. Therefore, Messrs. Bell & Langton have sensibly conceived their rearrangement of Madison Square upon semi-formal lines. It may appear that in drawing their main paths anew they have made diagonal circulation less direct; but measurements show that, if anything, they have shortened the diagonal courses. By suppressing the minor paths they have won space for wide lawns. Yet the accommodation for strollers and for playing children, and for rows of seats as well, which is lost in

rightly been removed to a less conspicuous station and discreetly screened by foliage on all sides.

In explaining their design Messrs. Bell & Langton say that the improvements they suggest would be accomplished with "no sacrifice worth mentioning of the existing trees," while those that would necessarily be removed would be compensated for by their new central avenue. They point out that "the careful planning of the shrub-planting has isolated the formal centre" of their design from the noisy streets on all sides, although particular care has been taken to avoid interference with the cooling breezes so grateful in summer. "It would probably prove advisable in execution," they add, "to follow the accepted rule of utilizing a number of species, though we propose so to concentrate these as to make effective masses of one or two kindred species which blossom or fruit at the same

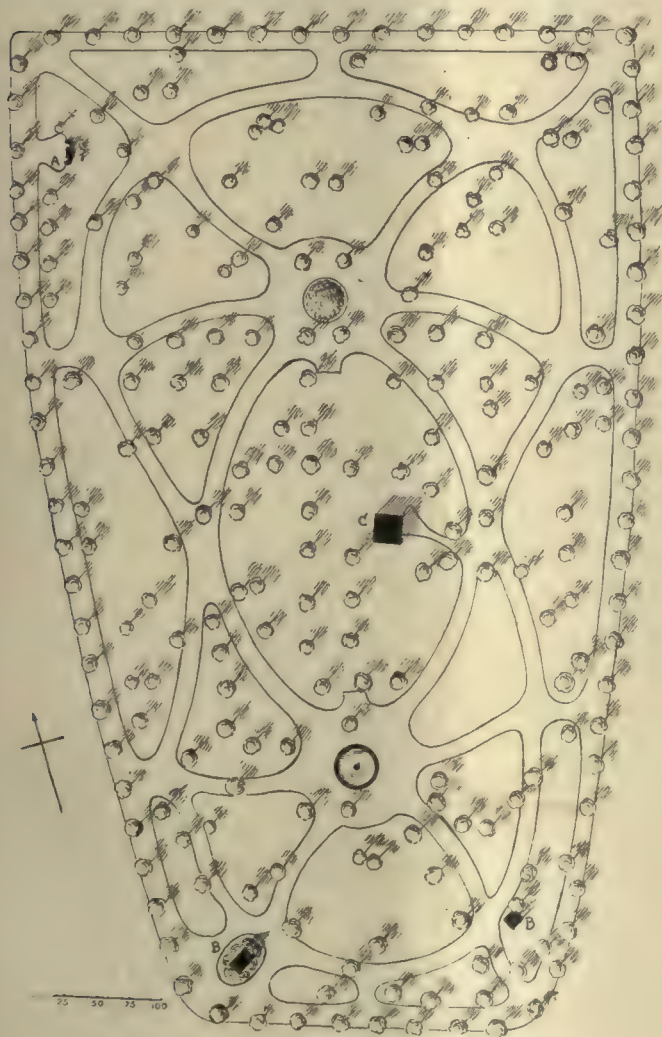


Fig. 18.—Present Arrangement of Madison Square, New York.

this way, is more than made good by the broad mall which forms the central feature of their design, the two parallel paths which lie beyond its flanking flower-beds, and the large open circles which surround the basin that now exists, and the one which they indicate as balancing it toward the north. The formal flower-beds, thus properly conceived as important parts of a formal scheme, would be effective and delightful in themselves and would increase that beauty of general effect which they ruin when they are intruded into a purely naturalistic scheme. The Farragut Monument (A) is left in its present place, while its back is screened by shrubs, as was intended when it was built. The statues of Seward and Conklin (B, B), which now look as though they had been dropped down by accident, are properly incorporated with the more formal part of the pleasure-ground. The kiosk (C), a necessary convenience, has

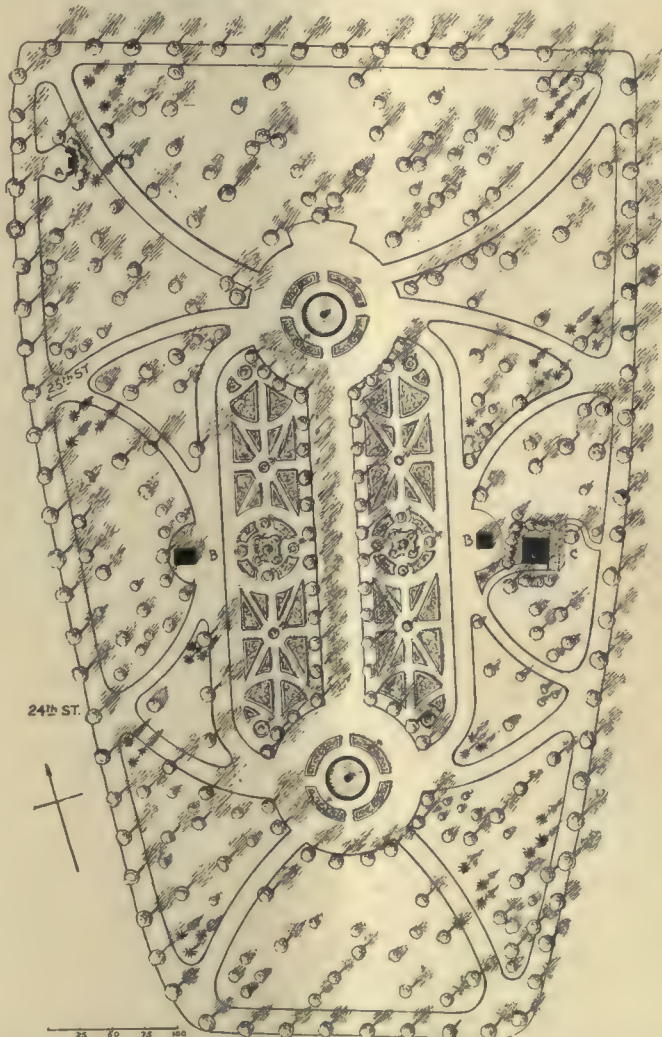


Fig. 19.—Suggestion for the Improvement of Madison Square, by E. Hamilton Bell and Daniel W. Langton.

season, thus providing a constant succession of attractive blossoming throughout the year. But a more satisfactory and artistic proceeding in a city like New York would be to treat the entire park as a unit, filling it with trees and shrubs all of which reach their prime of beauty at the same season. Thus, if Madison Square were so planted as to blossom in May, it might be made an object of enjoyment and pilgrimage not only to New Yorkers, but to the residents of the entire neighborhood. When this blossoming season was over, the flowers in the formal garden, set in the green park, would take up the succession and carry it through the year. One of the other parks might be so planned as to bloom later in the summer, and yet another to be at its prime in the autumn."

This is an interesting suggestion, yet there are some reasons against its adoption in a large and busy city like New

York. The pleasure of the majority should be chiefly considered. The majority of those who enjoy our small parks are the persons who have the habit of frequenting the same one day by day, or who pass it perforce in their daily round to and from their places of business, or whose windows look out upon it. And these people might—I do not say that they would—prefer to have their park display as many as possible of the beauties characteristic of each season in turn rather than to find it supremely attractive at any one season.

But, be this as it may, Madison Square would be improved for all seasons if it were rearranged according to Messrs. Bell & Langton's plan. This does not mean that the plan is faultless. In the first place, its authors were obliged to accept the trees as they stand instead of conceiving their plantations as an harmonious whole. Then, this fact puts difficulties in the way of shrub-planting; for, while many shrubs grow well under trees if they are planted when the trees are, and become well established before the ground is shaded, it is harder to induce them to thrive when set after the associated trees have attained their growth. And, finally, an actual mistake may be pointed out in the new plan: lawns which run to sharp points are undesirable in public pleasure-grounds because unruly feet are almost certain to trample upon these points, and also because the grass will dry out and the lawn-mower does not easily reach them. Nevertheless, considering the attendant difficulties, the plan is interesting. It is published here less with the idea that Madison Square may actually be renovated according to its indications than in the belief that a comparison of it with the existing state of the Square will be instructive to those charged with the arrangement of new small parks in this and other cities. Sometimes, even in small urban parks, conspicuous features may prescribe a naturalistic method of treatment. This was the case, for example, on Mount Morris Park, in Harlem, where the existence of a bold rocky hill, as tall as the surrounding houses, inspired the reservation of the tract around it. But such instances are very rare. As a rule, a formal or semi-formal manner of treatment, resulting in a pleasure-ground which is properly to be called a large garden rather than a park, must be most appropriate for restricted areas in the heart of a great city. And Messrs. Bell & Langton show that such a manner of treatment need not exclude variety in design, abundance of shade, the reposeful effect of wide green lawns, or even such seemingly unstudied, yet artistic, arrangements of trees, shrubs and grass as may produce pleasingly naturalistic impressions and illusions.

New York City.

M. G. Van Rensselaer.

Foreign Correspondence.

London Letter.

LISSOCHILUS CRISTATUS.—This is a beautiful terrestrial Orchid in the way of *Lissochilus Krebsii*, and evidently as likely to thrive under artificial treatment as that species, hitherto the only one of the thirty species known that deserves to rank with good garden Orchids. *L. cristatus* was named by Mr. Rolfe on its first flowering at Kew in September, 1892, having been received from Uganda, where it was collected on the hills by Mr. Buchanan. It has lately flowered also in a garden in Liverpool and the scape has been sent to Kew. The pseudo-bulbs are ovoid, the leaves narrow, lanceolate, thick and somewhat fleshy, and about a foot long. The scape is erect, thirty inches long, and it bears ten flowers, each one and a half inches across; sepals small, dull purple; petals broadly oval, nearly an inch long, flat, purplish crimson in front, bright yellow behind; lip saccate, with a distinct spur; the mouth wide, the front lobe short, with prominent ridges, bright yellow, with a maroon-colored tip; column short, purplish, with a green apex. *L. Krebsii* grows and flowers freely at Kew in a warm greenhouse, and *L. cristatus* promises to do equally well under similar treatment. It is an Orchid

which, if a few hundred plants were placed on the market, would secure ready buyers.

CYPRIPEDIUM SANDERÆ.—One thousand plants, recently imported, were sold by auction here last week under this "provisional" name. The description states that this is the best *Cypripedium* for cutting purposes ever introduced, and that from photographs and measurements received with the plants this species is believed to be far and away the largest of the genus yet discovered. Here is a description of the flower:

Dorsal sepal broadly spear-shaped, the basal portion, median line and veins a warm crimson-maroon, the central portion a clear canary-yellow tinged with green and with a broad margin of pure white. The lateral petals, disposed at right angles to the pouch and dorsal sepal, are of great breadth, much broader than in any other *Cypripede* we know of; most distinct and beautiful in color, the upper half of each petal is of the same color as the basal portion of the dorsal sepal, the lower halves being a clear yellow, slightly shaded in some instances with maroon. The pouch is unique in shape, being much narrower and more elongated than any other in the genus; in color it is yellow shading into ochre. Most beautiful and quite novel in shape.

I cannot identify this vague description with any known species of *Cypripedium*, unless it be an ally of *C. villosum*. The plants were in excellent condition, and we shall, no doubt, soon be in a position to judge whether it deserves all that the venders say of it. At the same time protest must be made against this growing practice with Orchid dealers of giving new names to plants on the chance of their proving new when they flower.

An importation of "a new and magnificent *Cypripedium* from the Malayan archipelago" was sold by auction this week. Is it likely that this is identical with the preceding? The collector in this case states that he discovered the plants in an island devoid of civilization, and that this "is certainly the grandest *Cypripedium* I have ever seen, and should prove one of the most sensational productions of late years." In this case the vender has omitted to give the plant a name.

CÆLOGYNE VIRGINALIS is still another "provisionally named" introduction of which a hundred plants were sold in London this week. It is described as a new species with large, well-shaped pure white blossoms in the way of *C. cristata*, and deliciously fragrant. They are produced in great abundance during the winter months. The exigencies of trade may justify this kind of proceeding, but it is utterly bad in a botanical sense.

ZYGOPETALUM PERRENONDI.—This is a beautiful hybrid which has been raised by Monsieur A. Peeters, nurseryman, Brussels, from *Zygopetalum intermedium* and *Z. maxillare Gauteri*. It was exhibited last week and was awarded a certificate by the Royal Horticultural Society. It bore a stout scape of five flowers, each nearly three inches across, the sepals and petals lanceolate, spreading, with recurved margins, colored green, with bands of dark brown, and the lip of the same shape as *Z. Mackayi*, colored intense violet-blue, with reticulations of a darker shade.

MILTONIA BLEUANA AUREA is a variety of this remarkable hybrid, in which the flowers are four inches across and the white labellum is conspicuously marked with yellow at the base. It was shown last week by Monsieur Peeters and received a first-class certificate.

ANGULOEA UNIFLORA.—An importation of this well-known Orchid, the type of the genus, in fact, was sold in London a few weeks ago under the "provisional" name of *Anguloea albo-magna*. Some of the plants have flowered lately and prove to be identical with the plant figured in *The Botanical Magazine*, t. 4807. The flowers are of medium size, white, tinged with rose and spotted with pale red.

EPIDENDRUM ELEGANTULUM is a new Veitchian hybrid in which there are two parts of *E. Wallisii* and one of *E. Endresii*, the two species named having been first crossed and the product crossed again with *E. Wallisii*. It was shown in flower last week and obtained a first-class cer-

tificate. The flowers, which are in terminal panicles on leafy stems, are one and a half inches across, the sepals and petals ovate, concave, fleshy, dark brown, with reddish eye-like spots, and the flat, fringed lip is white and yellow, with rose-colored spots.

CYMBIDIUM LOWIO-EBURNEUM.—Sir Trevor Lawrence has emulated Messrs. Veitch & Sons by crossing *Cymbidium Lowii* and *C. eburneum*, but reversed the parentage. The result is a hybrid of superior merit to that raised by Messrs. Veitch, the flowers of Sir Trevor's plant being ivory-white, with plane segments and a labellum conspicuously marked with a V-shaped blotch of crimson. It was shown in flower last week and was awarded a first-class certificate.

6,000 feet. I think they would thrive with you if fastened onto the south side of a tree trunk in a sheltered spot out-of-doors. I do not say that the plant would safely pass through a winter like that of 1894-95, but I think it would live outside through an average English winter. Ten to fifteen degrees of frost are often experienced where I gathered these plants, and the winds are often cold and cutting. You might make the experiment, and the result would probably be interesting."

CONIFERÆ.—A hand-list of *Coniferæ* and *Taxaceæ* grown in the Royal Gardens, Kew, has just been issued, and may be obtained from the curator, price threepence. It comprises 227 species, with 340 varieties, belonging to thirty



Fig. 20.—*Quercus Californica*, in Oregon.—See page 146.

LELIO-CATTLEYA DORIS, a hybrid between *L. harpophylla* and *C. Trianae*, raised simultaneously by Messrs. Veitch & Sons and Mr. Norman Cookson, is an enlarged *L. harpophylla*, the lip only bearing distinct evidences of the *Cattleya* in its size, shape and tinge of purple. It received a certificate last week.

CÆLOGYNE CRISTATA.—We grow this plant either in a stove or a warm greenhouse temperature, but, according to a correspondent in Saharumpur, in the north-west provinces of India, it is found wild under conditions which seem to indicate a hardier constitution than is commonly attributed to it. He writes: "The plants I send were collected from the face of exposed rocks at Mussoorie at an elevation of

seven genera. The arrangement of the genera differs in a few particulars from that followed by Bentham and Hooker in the *Genera Plantarum*, and the species are referred to the genera under which they have been placed by the latest authorities. Dr. Masters, F.R.S., the acknowledged authority on the nomenclature of conifers in this country, has assisted in the preparation of the list, which is prefaced by an interesting historical introduction by Sir Joseph Hooker, who has always taken a peculiar interest in this group of plants, and to whose exertions, when Director at Kew, the extent and richness of the collection of *Coniferæ* at Kew is largely due. In 1877 Sir Joseph's interest in conifers was one of the main influences which induced

him to undertake an extensive journey in western North America, and the collection of cones, etc., which he then formed is now in the Kew Museum. The synonymy of *Coniferae* revealed by this list is appalling. Cultivators of these plants will find the list valuable.

London.

W. Watson.

Plant Notes.

Quercus Californica.

KELLOGG'S Oak, a western representative of the Black Oaks, is found distributed throughout the length of California in the coast mountains and on the western slopes of the Sierras, and in Oregon as far north as Eugene, ten miles north of that city being its most northern limit.

This tree, a photograph of which is reproduced on page 145, is one of large dimensions and of fine, open, widely branching and symmetrical habit. The trunk is rather short, but is thick and stout. The bark is dark in color (whence the popular Oregon name, Black Oak), one and a half inches thick and rather deeply fissured longitudinally. The twigs and leaves when young are clothed with a dense white pubescence, which, however, soon disappears. The dark twigs are then smooth, straight and more slender than those of the Garry Oak, giving the tree a cleaner, more open appearance. The leaves are oval in outline, the lobes cut moderately deep, and these and the lobules pointed with delicate spines. The petioles are short and slender. The scales of the cups are thin, ovate, obtuse, flat and imbricated and light brown in color.

The wood of this tree is especially worthy of notice. The heart-wood has a reddish hue, the sap being darker and lacking the red color. The pores of the wood are numerous and slightly wavy; the medullary rays are well marked and not broad, but thick and pronounced in the tangential and radial cut. Samples of the wood, even in an unpolished state, are always admired. The tangential cut is noticeably rich in figure, and the waviness of the vessels, too, is more marked than in the radial or quartered cut. It ought to be a great favorite for decoration and interior finish. It is, however, a little-known and still less appreciated wood.

The bark is said to be rich in tannin and brings about twice as much in the market as Hemlock bark.

The tree here reproduced is an old landmark standing in Eugene, Oregon. It is something more than four feet in diameter and is known in that locality as "Henderson's Big Oak."

Pacific University, Forest Grove, Oregon.

Francis E. Lloyd.

ANDROMEDA MARIANA.—A correspondent sends to this office a branch of *Andromeda Mariana* in flower, with the inquiry whether this shrub is ever planted for ornament. Whether the branch was cut from a plant forced under glass or whether it had merely been cut from a wild plant and brought into flower by placing it in water, we are not informed. We have never seen the latter method tested, although, without much doubt, this *Andromeda*, like many other plants whose flowers are produced on last year's wood, would open its buds if treated in this way. The flowers themselves, however produced, ought to be sufficient evidence as to the desirability of this shrub for planting, at least in certain situations. It is found along the coast as far north as Rhode Island and is abundant in the Pine region of New Jersey and in Long Island in moist and sandy situations. It is a comparatively low shrub, rarely four feet high, with shining, leathery, deciduous leaves, and large, white, waxy, bell-shaped flowers clustered along the branches of the preceding year's growth. It thrives without any special care, if planted in deep loam, particularly if some peat is mixed with it. It is one of the handsomest shrubs of a genus which includes such excellent native plants as *Andromeda speciosa* and the evergreen *A. floribunda*. In autumn its long wand-like branches retain their foliage late, when it turns to an in-

tense scarlet color. It is said to poison sheep which browse upon its leaves, and this gives significance to its common name, the Stagger-bush.

IRIS ASIATICA.—This is hardly to be classed among the winter-flowering Irises, although it was flowering in a cool house with Mr. Gerard a few days ago. It is an attractive plant, akin to *I. pallida*, but inferior to good forms of this species in the size of its flower and in distinction of habit. The flower is of fair size, dark purple, and under artificial light shows a reddish hue. There is a quite distinct blotch of darker purple on the lip of falls. The scapes are four-flowered. In a cool house, however, there are no winter-flowering Irises as satisfactory as *I. stylosa* and its varieties. If well cared for during the summer they make strong growths and flower continuously during the winter under any protection secure from frosts. The plants are fairly hardy in this latitude, but the usual weather conditions are too rigorous to admit of good flowers in the open. This plant seems a favorite in the open in southern England, but the latitude of Richmond, or possibly Washington, would probably be as far north as they could be grown with any satisfactory result in the garden.

KNIPHOFIA PAUCIFLORA.—This is a distinct species of what is generally a showy genus, and it will flower very early with little encouragement but only a botanist would recognize this as one of the Red-hot Poker plants. The tubular flowers, slightly less than one inch long, are borne sparsely on one side and at the top of a thin scape some eighteen inches long. They are of a light straw-color and pretty, rather than striking. The leaves are very narrow and deeply channeled.

Cultural Department.

The Earliest Spring Flowers.

WITH the flowering of the first Daffodils one feels that the spring has fairly arrived now at the end of March. Nature has broken no promises this season, for the weather has been uniformly bad, for the garden at least, as the temperature has been at all times low, with little chance for the winter-flowering plants to progress, and only a rare flurry of snow to protect green foliage.

The impatient Snowdrops even have been discouraged this year, and though they have been peeping since the holidays they have waited for March. Some belated snow, melting quickly, with less rigorous weather, has reminded the alpine bulbs that it was time to waken; and for the last fortnight the garden has been rapidly gaining cheerful bits of color. Of course, those early plants will vary in their flowering time very much from year to year as the weather permits, but there are other influences also at work each year. For instance, the vigor of a plant at flowering time depends on the growth made after flowering the previous year, and a weak growth one year will retard its flowering time the year following.

A number of new Snowdrops received from Mr. Whittall, who had collected them in different locations, are not found to be specially distinct from those already known, but those which last year were found in flower on Mount Taurus in May were here among the earliest to open. *Chionodoxas* are becoming plentiful, but the brightest blue effect in the garden is made by the early Squills, *Scilla Sibirica*, which also came from Asia. These *Scillas* are not only earlier than the typical *S. Sibirica*, so long grown in gardens, but they are brighter in color. They are now (April 1st) in full flower, though the ordinary ones are scarcely started. The white variety, however, is rapidly advancing, and is rather earlier than the white form of *S. bifolia*. Yellow Crocuses, *C. aureus*, have been flowering bravely for some weeks, and very cheerful their color is. Early spring and late fall Crocuses suffer many persecutions from the weather, which they do not withstand very well, and natural selection does not seem to have been very active among them.

At present *Iris Rosenbachiana* is the handsomest individual flower in the garden. This hardy plant from Bokhara has the largest flowers of any of the early Irises, and they are somewhat variable in color, the ones now open being a rich vinous red. A few Irises of the *Reticulata* class have flowered, the dainty *I. Kolpakowskyana* and a nice form of *I. Krelagii*, and there are a few collected ones in the corner, which, aside from being wildings, are interesting since they came from Mrs.

Barnum, of Harpoot, only a few weeks before the troubles broke over the American Mission.

The forerunner of the Daffodils is *Narcissus minimus*, which is as bright as it is dainty. It is a very miniature Ajax, quite small enough to serve in the corsage of a fairy.

Elizabeth, N. J.

J. N. Gerard.

Orchids at Langwater Gardens.

PLEUROTHALLIS ROEZLI was among many new and rare Orchids in bloom recently at the gardens of Mrs. F. L. Ames, North Easton, Massachusetts. It is really more curious than beautiful, and valuable rather on account of its rarity. The Langwater plant is probably the finest specimen in cultivation. It bears eighteen spreading scapes of pendent, irregularly globose flowers of deep wine-color. It is here grown in a basket in the Masdevallia house, and, apparently, is quite at home. It has also been noted by Mr. Watson, in his London letter (GARDEN AND FOREST, No. 420).

The *Masdevallias* in this collection have frequently been referred to in GARDEN AND FOREST. Seedlings and hybrids multiply with great spontaneity. A small specimen of the strangely curious *M. muscosa* is in a six-inch pan, the plant being not more than ten inches in diameter and six inches high, but it carries thirty-six hairy scapes of yellow flowers. It is chiefly interesting on account of the sensitive character of the lip. Watson, in his book on Orchids, says: "At Kew, in 1887, a small plant of *M. muscosa* flowered for the first time in England. It had short thick leaves, erect, hairy flower-scapes and flowers half an inch across; the lip was hinged and had a concave blade one-fourth of an inch long, in the middle of which was a raised yellow disk. On touching this disk the lip moved upward and closed with a jerk, and it was found that any small insect on alighting on the lip was at once trapped and held for twenty minutes, when the lip opened again. Charles Darwin, who regretted never having seen a sensitive Orchid, would have been delighted had he seen this."

It is difficult to trace the parentage of many of the natural hybrids originating here. What they are may be generally surmised. The majority are evidently between *M. Lindeni*, *M. ignea* and *M. Harryana*. Rebecca, named in honor of Miss Ames, is a brilliant orange, shaded with crimson. Another unnamed kind is a most beautiful violet-purple. *M. Lowii* is very rare. It is remarkable for the violet papillæ covering three-fourths of the length of the sepals, their bases being bronzy, and tips, or tails, white. In *M. Hincksiana* the sepals are yellow, deepening toward the tips; the centre of the flower is white. This lovely hybrid is a cross between *M. ignea* and *M. Tovariensis*. The flowers of *M. bella* are most curiously formed; the long tails cross over the triangular-shaped flowers in such a way as to suggest some large insects; and flowering as they do, from willow baskets suspended above one's head, the effect is heightened. The specific title would suggest beauty, but in this respect the flowers were not to be compared with many others.

Wellesley, Mass.

T. D. Hatfield.

Bomareas.

THESE remarkable twining plants are nearly related to the *Alstroemerias*. They are natives of the mountain regions of Central America, Colombia and Peru, and have been known in gardens some twenty years or more. As yet they are rare in America, although especially adapted to a bright, sunny climate like ours. They thrive well in moderately warm greenhouses in the north, and are probably quite hardy farther south. All are very floriferous and deserve to be grown for the sake of their large, gorgeously spotted flowers, which are generally very brightly colored. Some flower in early spring, others throughout the summer, the flowers being produced in large umbels or cymes on terminal or lateral shoots. The leaves are more or less lanceolate, with parallel veins. The stem is slender and grows from a fleshy root to a height of twelve or fifteen feet, and even higher under favorable conditions. Among the several species cultivated the most common, as well as the most attractive, are the following: *Bomarea Carderi*, a magnificent Colombian species, with broadly lanceolate leaves six or eight inches long and very large bell-shaped flowers on long peduncles, collected in loose, many-flowered pendulous cymes. The three outer segments of the perianth are rose-colored and three inner ones paler, and all spotted near the apex with numerous dark purple spots; *B. Schuttletworthii*, another very showy species, with flowers two inches long in drooping umbels, with the outer segments orange-scarlet and inner ones yellow, all greenish and spotted near the apex; *B. oligantha*, with very much smaller

but very attractive flowers, about an inch long, funnel-shaped, with the three outer segments sepal-like, reddish green and smaller than the inner ones, which are broader, tawny yellow and but faintly spotted.

The *Bomareas* delight in a rich, fibrous soil and require plenty of water during the growing season, which commences early in spring. Late in fall the stems are cut down to the ground and the roots are kept in the soil in a dry state. They do best planted out in an open and sunny position in a cool conservatory or greenhouse where they may have plenty of air in summer. The propagation is best effected by means of seeds, which germinate quite easily when fresh, and if sown in shallow pans in a warm propagation-house, but as this method is somewhat slow they may also be increased by a careful division of the fleshy roots.

Newark, N. J.

N. J. Rose.

Seasonable Flowers in the Cool Greenhouse.

IT is not difficult to have cool greenhouses attractive at this season, even where but few rare and expensive plants are available. Just now our own houses are gay with *Cinerarias*, and the individual blooms seem to increase in size each year, some of them being three and a half inches across. *Primula Sinensis* is nearly over, having been flowering since the second week in December. *P. obconica* is at its best, and our largest plants, in eight-inch pots, each carry from fifty to seventy flower-scapes. *P. floribunda*, a pretty little yellow species from the western Himalayas, deserves to be grown more extensively. We sow our *Primula* seed early in April, and as soon as the seedlings are large enough they are pricked off into boxes four inches deep, with a soil composed principally of leaf-mold. They remain in these boxes in the greenhouse, or in a well-shaded frame, till August, when they are potted. They grow very rapidly during the fall and are shifted on as they require it into larger pots. Treated in this way they are very little trouble and very satisfactory. The later species of *Narcissus* are now in flower, and one of the very best is the variety of *N. bicolor*, commonly called Grandee. The perianth segments are a pale sulphur color, which contrasts beautifully with the rich golden corona. The flowers are about three and a half inches in diameter, and each bulb produces two and often three. Of course, the fragrant *Poet's Narcissus* is good for late bloom. *Ixias* and *Ornithogalums* are just coming into flower. English Daisies, in four-inch pots, are useful for the front edge of the stages. The varieties Longfellow (pink) and Snowball (white) are very good when they come double, but a great many seedlings are apt to come single or semi-double. *Myosotis alpestris*, besides being a good spring bedding plant, does well in a cool greenhouse. *Schizanthus pinnatus* has been flowering profusely for the last two months; its beautiful sprays of white and lavender-colored flowers last a long time when cut. *Calendula pluvialis*, the Cape Marigold, is another annual which does well in the greenhouse, but it unfortunately closes its flowers early in the afternoon. *Aquilegias* are useful where a varied supply of flowers has to be kept up. Last September we lifted some clumps of *A. Canadensis* and *A. atrata*; these were potted and kept in a cold frame till the end of January, when they were brought into the greenhouse, where for the past three weeks they have made a fine show. The double-flowered pink *Lychnis flos-cuculi* is just now at its best.

In the warm temperate greenhouse stocky plants of *Fuschia speciosa* and *Rose of Castile*, in five-inch pots, are flowering profusely. *Torenia Fournieri* and *Impatiens Sultani* have been flowering all winter and are very beautiful, though of no use for cutting. *Swainsonia galegifolia*, with its beautiful sprays of pea-shaped flowers and pinnate foliage, is one of the best winter-flowering plants we have, and Abutilon, Golden Bells, is proving an excellent free-blooming variety. Some cuttings of a double-flowered form of *Tropæolum Lobbianum*, received here last fall, are now in flower, and though to many the flowers are not as attractive as the single kind, it is the most profuse blooming *Tropæolum* I have ever met with.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Clanthus Dampieri.—It is thirty years since this plant was first brought from the deserts of Australia, and, though extremely beautiful as well as interesting, many persons have never seen it in flower. Its common name, the Glory Pea, is a translation of its generic name, and since it belongs to the Pea family and bears flowers of the brightest scarlet it well deserves the title. It is also called at times the Parrot's Beak, from its sharply curved and pointed keel. The lower part of

the standard carries an almost black-purple boss. These handsome flowers are borne on five-angled stems proceeding from the axils of the leaves in clusters of four or five, and they are individually four inches long by one inch wide. The pinnate foliage is pale green, covered with a silvery down. The plants should be propagated by seed sown singly in four or five inch pots, which should be well drained. The soil is better if prepared of about equal mixtures of loam, leaf-mold and sand, with a little charcoal to prevent its becoming sour before the roots have filled the pots. If sown in smaller pots the roots are liable to be hurt in transplanting, and any injury happening to them while young means sure death to the plant. Neglect of caution in this particular has given the Glory Pea the reputation of being difficult to cultivate, but when treated as recommended above it is not a very untractable plant. Seeds sown at this season will germinate in a temperature of sixty degrees, and if properly cared for the plants flower well in the greenhouse late in the following winter or spring.

Northampton, Mass.

E. J. C.

Hippeastrum Ackermanni.—The *Hippeastrums* are especially adapted to the American climate. Whether grown indoors as conservatory or house plants, or in the open ground in the southern states, they grow and flower very profusely. The above old-fashioned species is one of the most common plants now seen in windows and apartments. The plants are generally large and robust, with two or three scapes, each bearing several very large and showy crimson flowers, which last in perfect beauty for several weeks, if kept in a moderately cool place. The culture of this species is so simple that anybody ought to succeed in growing it with very moderate attentions. The growing season begins early in spring or late in winter, and from that time until September abundant watering is necessary. Afterward water should be given more sparingly, and in the bright autumn months the bulbs will ripen thoroughly. The leaves should not be allowed to die for want of water, even when stored away beneath the benches in a greenhouse. *H. Johnsoni* is a less common species with a white band down the middle of each segment of the perianth. It is of equally easy culture. All species require a rich, fibrous soil.

Wellesley, Mass.

T. D. H.

Hardiness of *Aspidistra lurida*.—Some remarks on *Aspidistra lurida* which I recently saw in GARDEN AND FOREST remind me to say that it is quite hardy in Philadelphia. Your correspondent, Mr. E. J. Canning, found it hardy when living in this vicinity, and I have recently seen a large number of plants used in a narrow border, close to a building, and they have withstood the winter perfectly. It may be hardy much farther north than this, and if so it will prove a most useful dwarf evergreen, and quite unlike any other which we now have at command. It is a Chinese plant, and possibly plants from seed gathered in the extreme northern part of its natural range might endure New England winters.

Germantown, Pa.

Joseph Meehan.

Correspondence.

Nurseries at Bay Ridge, New York.

To the Editor of GARDEN AND FOREST:

Sir,—A visit to the nurseries at Bay Ridge, an outlying suburb of Brooklyn on the Bay shore, cannot fail to be interesting to the flower lover and highly instructive to the practical cultivator at this season. Here, in the three large establishments of John Dean, James Weir's Sons and John M. Keller, seventy-five glass houses were last week closely filled with Easter plants. Many of these structures are 200 feet long, a few stretching 230 feet, with a span of twenty-two feet. As much as 60,000 square feet of glass and four acres of ground, perhaps, is in use in each one of the places. The enormous trade in cut flowers and plants in cities the year through can scarcely be conceived by the occasional buyer of a corsage bouquet or a plant in the holiday season. At Weirs', for example, there are twenty-five greenhouses. For the Easter trade these were largely planted with Lilies, as many as 2,600 pots of this seasonable plant extending 200 feet through the middle of several of the houses. A house of equal length was a continuous bed of the delicate Maiden-hair Fern, *Adiantum cuneatum*, the plants in five-inch pots. Another was given up to climbing *Asparagus*, one to *Smilax*, another to Palms, *Araucarias*, Rubber-plants and the like, and the most brilliant effect of all was a house of General Grant *Geraniums*, some 2,200 of the plants being in full glow. Besides 30,000 bulbs of the Bermuda Lily in different stages of forcing, some being

brought on for use as late as Decoration Day, there were immense collections of *Azaleas* and *Hydrangeas*, at least 1,000 plants of each being covered with bloom, the latter very fully flowered and with unusually thrifty foliage. On the side benches in these houses were bedding-plants for the spring-planting trade, as *Geraniums*, *Coleus*, *Ageratum*, *Vinca*, *Lantanas* and rosy stretches of *Alternanthera*. One house was given over to propagating. *Marguerites* occupied 100 feet of space, and *Spiraeas* as much more, while there were 5,000 *Hyacinths* forced into flower. This great establishment is exclusively devoted to plants for the Easter trade, to spring-bedding plants and *Chrysanthemums*. An idea of the quantity of stock handled in the city retail flower-shops may be had when it is realized that in the two stores of the Messrs. Weir in Brooklyn, besides all that is grown at Bay Ridge, as many as 5,000 to 20,000 roses alone, and some thousands of other cut flowers, are each day bought in New York City, and also during the planting season a great van-load of bedding stuff.

In each of these great nurseries Lilies were in greatest abundance, *Azaleas* following in numbers. In Mr. Keller's twenty-eight houses *Genistas* of both the two common market varieties, *Cytisus racemosus* and *C. Canariensis*, were conspicuous, and, besides the standard plants of the season, there was a large and interesting variety in which were forced *Rhododendrons*, *Lilacs*, the beautiful broad-leaved *Kalmias*, *Andromeda speciosa*, with its dainty bell-shaped white flowers, which are disguised by retail dealers under the name of Canterbury Bells; *Metrosideros*, the striking Bottle-brush plant, and beautifully berried plants of *Ardisia crenulata*. In one large space, fifty by eighty feet, obtained by the removal of the dividing-walls of three houses, seven broad benches of *Hydrangeas* gave an impression of rude vigor, the roof being utilized for baskets of *Cattleya Trianae* and *Oncidiums*.

In Mr. Dean's houses *Azaleas* were the most striking feature. The best specimen plants were comprised in about a dozen selected sorts. *Niobe*, a large double white flower, with lemon tinge at the base of the upper petals and almost bud-like centre, was the best white shown, while *Bernhard Andrea alba*, of snowy whiteness, was also attractive. Dr. Moore was the best pink, a single flower with closely twisted centre, of clear bright solid rose-pink and satiny sheen. Another good flower of this color was *Madame Van der Cruysen*, less even in tint, the upper petals distinctly splashed with crimson, and the flower more open at the centre. *Empress of India* was a delicate true pink with a white edge. The richest color in the entire collection was that shown in the clear rich crimson of the flowers of *Le Flambeau*. These were rather small, single, almost entirely free from spots, with only a faint marking of a deeper shade. *Vervæneana* showed immense flowers with the inner petals twisted, the outer edge of the petals white, the middle a bright splash of pink. Other notable sorts were *Mademoiselle Marie Vervaene*, distinct red and white stripe, resembling the Helen Keller carnation; *Czar Alexandre III.*, brick-color, splashed with red; *Souvenir du Prince Albert*, clear medium shade of pink, irregularly edged with white, double, small; *Hermione*, rich deep pink, very double; *Versicolor*, a large single flower of most distinct effect, the petals greenish white, boldly striped and splashed with brick-red, this color sometimes occupying a solid quarter of the flower. Besides these, varieties having special merit were *Simon Mardner*, *Louise Pynaert*, *Sakuntala*, *Comte de Chambord*, *Madame de Greve*, *Antigone* and *Estandard de Flandre*. These varieties were all free from unpleasant tints, the 3,000 plants having an average size of fifteen inches in diameter and eighteen inches in height, in six-inch pots. Of course, there were specimens of much larger size. Easter being a movable feast, the same sorts are not the best for all years, but these were the best kinds this year.

This season of trade, the largest of the entire year, preceding, as it does, the regular spring business, needs long preparation. Indeed, the work for Easter laps over more than a year. The Lily-bulbs are ordered immediately after Easter and delivered from Bermuda in July, when they are at once potted and placed out-of-doors; in the fall, after the *Chrysanthemums* are removed from the houses and severe frost is threatened, the Lilies are brought indoors and kept in a night temperature of forty to forty-five degrees until Christmas or New Year's, when they are urged forward in a higher temperature. One bulb is planted in a six-inch pot, and beautiful effects are produced by grouping five or six plants in twelve-inch pots. These masses are three to four feet high and carry thirty-five to forty flowers, the rich foliage being almost as strikingly decorative as the flowers. The Bermuda Lily is grown in preference to *Lilium longiflorum*, because its flowers are more easily produced in abundance under less favorable treatment, and they last longer. This Lily is sometimes called

soft, not because this is its real character, but because it has been forced too hard. *L. longiflorum* fails entirely under too severe urging, the buds coming blind, or not appearing at all. The two sorts potted on the same day will show flowers on the taller-growing and more spreading Bermuda Lily by Thanksgiving Day, while the older *longiflorum*, of more sturdy and upright habit, cannot be flowered before February. An important and exacting detail of cultivation is the examination of every lily as soon as it expands, for the removal of the pollen before it is ripened and has been shed and made its yellow stain on the pure white flowers. This is done by hand and requires going over the stock once and even twice a day. It may be worth while saying that no Ascension Lilies or Callas were seen in any of these collections. While the regular stock of Lilies is each year produced from freshly imported bulbs, in some of these large nurseries the Lily plants, when returned, are dumped out-of-doors and picked over later in the season. The best bulbs are planted in July or August in frames and protected over winter. These plants bear, during the next spring, one or two flowers each, for the six to ten of the first efflorescence, the blossoms being useful for funeral orders.

The stock of Azaleas is imported from Belgium in October, and these, with the Lilies, *Spiræas*, *Genistas*, *Hydrangeas* and other Easter plants, are started indoors at the same time and under the same general conditions. They are all carried along in gentle heat, Lilies being pushed forward about the beginning of Lent, the general idea being that it takes six weeks to get them into bloom from the forming of the bud. Azaleas, as a rule, need a shorter time to be brought into flower, though there is considerable difference in this respect in different varieties. *Hydrangeas*, which are propagated from cuttings made at the beginning of March a year ago, need longer forcing, and are started on in December. These are usually planted out in the open ground in summer, but Messrs. Weir last year kept them in pots and plunged them. The plants of *Genistas* are carried over from year to year, and when new ones are propagated it is from cuttings which require several years to bring them into flowering condition. *Genistas* are not often sold, but loaned for the Easter season. When returned to the cultivator they are repotted and pruned and plunged out-of-doors until autumn. The stock of *Spiræas* comes from Belgium, and its treatment is not unlike that of the other plants noted. Besides the old *Spiræa*, *Astilbe japonica*, and the increasingly popular *A. compacta*, there are this year some of the old-fashioned *Spiræa palmata*, with bright rose-colored trusses and handsome, deeply pinnate raspberry-like foliage. Bulbous plants, as *Narcissus*, *Tulips* and *Hyacinths*, are, of course, profusely grown in pots and pans for dressing up in baskets, and many cut blooms are sent to the stores.

After the stock is sufficiently advanced the temperature of the houses is reduced from the forcing heat of sixty-five or seventy degrees to fifty degrees, to harden off the plants. On Monday following Palm Sunday the work of removal of the plants begins, and during frosty weather the carting over muddy roads in immense padded wagons and heated vans is of itself an enormous undertaking.

New York.

M. B. C.

Protection for a Public Interest.

To the Editor of GARDEN AND FOREST:

Sir,—The bicycle has been taking people into the country of late and setting them in touch with nature, teaching them what they have never known before—that a landscape could be beautiful or interesting or inspiring. As the exuberant wheelman, who has just pulled himself up the hill, lifts his feet from the pedals and comfortably settles himself for a coast down the other side, he is peculiarly susceptible to the view from that hill-top. If he finds the coasting good he is likely to come to that hill again; and it is not long before he feels, and justly feels, that he has a right to the enjoyment of that prospect, with all its inspiration and refreshment. Imagine his feelings, then, when some day, as he pauses out of breath for his usual eye-feast, he finds a huge board curtain drawn across the landscape, and on it a screaming advertisement of the virtues of somebody's "germ destroyer." He knows that he has been robbed of what is his by right. If a painted landscape by Turner or Corot has a high money value, why shall we not estimate the real thing as worth something, and why should not its wanton destruction be counted a crime? If some man in the pursuit of his private business should blow up the Smithsonian Institution or an art museum he would meet with prompt punishment, yet the anarchist who paints signs does the same thing all summer long in the rural and suburban districts, and never hears a whisper of reproof.

Why not legislate against such an evil? It is a mistake to suppose that the venders themselves delight in this method of advertising. They are driven to it, perhaps, by competition, but by a competition which they would gladly evade. The advertising and bill-posting agency preys upon the dealers on one side, and inflicts itself on the public on the other. The agency alone would have to suffer if this unpleasant species of advertising were suppressed.

Could legislation reach this evil? Probably. The most feasible plan is, perhaps, that proposed in the Rural Advertisements Bill, which was brought before the English Parliament at its last session. The proposition was to tax all publicly displayed advertisements by the square foot. Such a tax could be easily levied and apportioned, and there would be no one but the bill-poster to lament if this tariff should be made prohibitory. This would be protection in a proper sense—protection in the enjoyment of one of our natural inheritances and against a nuisance. Suppose the patent-medicine man should follow me all day crying out in my ear that his nostrum was just the thing I needed to make me young again, would not the police interfere in my behalf? And why should a man assail his fellow-citizens' eyes with greater impunity than he assails their ears? All that such a plan of taxation would need anywhere would be some one to draft the bill and watch it through. Even the sign-painter would rather look for new employment than hire a lobby to defeat it.

University of Vermont.

F. A. Waugh.

Recent Publications.

Plant Breeding. By L. H. Bailey. New York: Mac-Millan & Co.

This little manual belongs to the Garden Craft Series, of which the excellent Horticulturist's Rule Book was the first number. It consists of five lectures setting forth those principles of evolution upon which any successful efforts at improving domestic plants must be based. There are few subjects upon which popular knowledge is so imperfect as the origination of new vegetable forms, and a compact treatise on its essentials is evidently needed, for until the horticulturist ceases to regard each novelty as a chance phenomenon without looking at the laws under which these organisms vary, there can be no sustained progress in the development of plants in any desired direction. The first lecture in Professor Bailey's little book treats of plant-variation and its philosophy, and after stating the fact of the individuality of the seed and of the bud, the principal causes of individual differences are explained, and then the reasons for choosing certain varieties and methods of fixing these, so far as these can be fixed, are discussed. The next lecture treats of the crossing of plants with reference to their improvement, after which a few concise rules are laid down for breeding domestic varieties, with specific examples. The book concludes with a practical chapter on the structure of flowers, and especially of their essential parts, with directions for manipulating them in crossing. This last topic is carefully illustrated and shows the simple tools needed, with such plain directions for using them, that any person of ordinary skill can do the work. There is an intermediate lecture, which consists of extracts from Verlot on the varieties of ornamental plants, Carrière's account of the varieties of ornamental plants with a list of bud varieties and Focke's interesting discussion on the characteristics of crosses. This little manual, with a glossary and complete index, comprises nearly three hundred clearly printed pages, and it ought to be in the hands of every studious horticulturist. If it does nothing else it will show him the limitations of his field and warn him against attempting impossibilities. But, besides this, it will point out the directions in which he can hopefully experiment and give him the assurance that he is working in the realm of law and not in one of chance.

Notes.

Another Canna, named Austria, and of the same strain with Italia, which was described and figured in our issue for April 1st, has flowered with Mr. Pierson at Tarrytown. We have not seen the flower, but, according to reports, it is even more

beautiful than the first one. It is very large, of a perfect yellow, with pencilings of scarlet on the two inner petals so faint as to be hardly visible. Whether these flowers will have sufficient substance to be valuable for out-of-door bedding remains to be proved, but, beyond all question, they are superb when grown under glass.

The blanched tops of Swede turnips are much used as a vegetable in England, but when they are grown with offensive surroundings, as is occasionally the case in old mushroom beds, of course they are inferior. A correspondent of *The Gardeners' Chronicle* writes that untrimmed turnips placed close together in a box, the bottom of which is covered with a few inches of damp sand and then loosely covered with a mat, will soon show a small forest of shoots of perfect flavor and free from the objectionable "turnipy" taste. Many persons consider them quite superior to the best grown sea kale.

Linseed-oil meal is rich in plant-foods, and if these were rated at their cost as obtained from nitrate of soda, dissolved bone-black and muriate of potash a ton of linseed-meal would have a fertilizing value of \$18.00, and would be worth for fertilizing purposes about \$26.00 as the ordinary mixed fertilizers are sold. A late bulletin from the Ohio Experiment Station calls attention to the fact that inasmuch as this meal is now selling at \$16.00 a ton the farmers who are buying fertilizers can get plant-food in this way at reasonable cost. The oil meal is so rich in nitrogen that fertilizers containing considerable phosphoric acid and potash should be mixed with it. By actual experiment in the Ohio station it was found that half a ton of oil meal worth \$8.00 gave as much increase on an acre of Wheat as a compound commercial fertilizer which cost \$11.00.

The Association for the Improvement of the Condition of the Poor in this city, under whose auspices the system of vacant-lot farming was conducted last year, have arranged for a series of lectures and object-lessons in different parts of Westchester County, of this state, with the view to the improvement in methods of horticulture and agriculture. Professors from the different agricultural colleges and experts in dairy practice and cultivation of different crops speak in the different towns on such subjects as Strawberry-culture, Apple-culture, Insects Injurious to Fruit, How to Suppress Epidemic Diseases among Plants, etc. This is practically an extension of the institute work and schools of horticulture which have been conducted in other parts of the state with signal success, and it is hoped that this new venture will prove equally helpful as an educating force.

At a late exhibition of flowers before the New York Farmers' Club, Mr. W. A. Manda, in connection with an interesting display of Orchids, delivered an address in which he said that many of these plants do not require so much moisture as is commonly supposed, watering once or twice a day and syringing the leaves daily being sufficient for them. He added, that at least twenty-five species and varieties could be grown as easily as Palms, and that a good place for some of the cool Orchids in summer is out under an Apple-tree. He named *Dendrobium nobile* and *D. Wardianum*, *Cypripedium insigne*, *C. villosum* and *C. Boxallii* as varieties which could be grown in any window. Even *Dendrobium Calceolus*, of which he had on exhibition a magnificent specimen, he pronounced a plant which could be perfectly well grown in an ordinary window. The cardinal point in Orchid culture is that they must certainly have a season of growth and a season of rest, which are in their homes seasons of rain and seasons of drought, and this indicates the proper treatment. The more growers learn about Orchids the more fresh air they give these plants.

The past week or ten days has probably been the most disastrous term of the season to fruit merchants, owing to unfavorable weather and dull sales. The prices of Mediterranean oranges fell twenty-five to fifty cents a box, and of lemons ten to twenty-five cents. California oranges were affected by this decided drop, and some car-loads of Navels were withdrawn from sale toward the end of last week on account of unsatisfactory prices. Lighter receipts of the Sicily fruits are expected, and delayed spring weather hoped for, when better prices are anticipated. Sicily oranges of the highest grade and desirable sizes sold last week to wholesale merchants for \$2.50 to \$3.00 a box, Valencias at \$2.75 to \$4.00, and California Navels at \$1.20 to \$3.50. A small shipment of Cayenne pineapples, large and of extra quality, came from Florida during the past fortnight. They were grown under glass, near Orlando, and sold at \$1.50 apiece in the fruit shops. It is between seasons now for this fruit, the first of the new crop, some 350 barrels, being due to-day from Cuba, but there will be no regular shipment

of this fruit from Havana for two weeks. The season for Bahama pineapples opens about the middle of May, and for those from Florida in June. The first pineapples from Cuba in 1894 arrived here April 10th, and last year April 15th. It is feared that shipments from Cuba will be interfered with by the war there, although importers depend upon more general forwarding from all over the island, so that any deficiency from particular sections usually depended upon will thus be made good. Even a more serious drawback is the injury to the crop by storms over a year ago, and more recently by lack of winter rains and unusually cold weather and strong winds during March, conditions which have prevailed generally throughout the West Indies, and which have made the crop late. The season for strawberries in Florida is nearing an end, and the best berries now coming from that state, smaller and less luscious than the perfect fruit of a week ago, cost forty-five cents for a quart box at retail.

The flower-stores of this city made a meagre sidewalk display, in comparison with that of former years, on the day before Easter, owing to windy and cold weather. Some of the best establishments made no outside sign of the great floral festival. Occasionally a line of pyramidal Box-trees stood out in wind-break fashion, but even double rows of these gave way before the sharp blasts. Indoors the plants were more fully and perfectly flowered than ever before in this market, though to an onlooker buyers seemed very few. Among the most beautiful and satisfying effects were plants of Lilac just beginning to open, the light and graceful thyrses singularly dainty in the unfolding of the flowers above the tender foliage. Genistas abounded in small plants a foot high for house use, and in tall, spreading specimens for church decorations. The long drooping wands of the closely flowered clear yellow *Cytisus Canariensis* was particularly satisfying in contrast with the muddy color and more rigid form of *C. racemosus*. Lilies and Azaleas were, of course, foremost in quantity, and there were Hydrangeas and Spiræas, the old form with its open and airy habit being more attractive than the newer variety known as compacta. There were strong shrubby little plants of *Kalmia*, bright and striking dashes of color in spikes of *Metrosideros*, fruiting Otaheite Oranges, plants of *Athrodema speciosa*, the branches thickly strung with the delicate white bells; vigorous large bushes of *Acacia*, the straight thick spikes often a foot and a half long and densely covered with globe-shaped feathery clear lemon flowers to within four or five inches of their extremities. Heaths were more abundant than ever before, while occasional forced specimens of *Spiræa Cantonensis* and *S. Thunbergii* were seen, covered with snowy bloom. Cinerarias were happily missed, with their usually decided and coarse colors; although not yet common, the new dwarf *Bougainvillea* is proving that it is a good plant for Easter flowering. Vigorous plants of *Magna Charta* Roses in promising bud and dainty pots of Moss Roses were among the scarcer plants. With the usual display of bulbous flowers gay and cheery beds of Pansies were pleasing and appropriate, and an occasional pot of well-flowered Primroses came as a pleasant relief to the more striking colors. Among the less common cut flowers there were Orchids in unusual variety, considerable quantities of anthuriums, spikes of gladiolus, stems of white snapdragon and tight bunches of trailing arbutus from the south. The real phenomenon of the Easter trade in this city was the hideous attempt at decorating the flower-pots with crêpe paper and ribbons. The result was more than grotesque—it was absolutely vulgar. In one window off shades of red, blue, purple, pink and yellow, besides white and parti-colored papers, with ribbons of conflicting tints, and arranged with no reference to the colors of the flowering plants, made a most offensive display. Presumably well-grown plants were disguised in crimped and ruffled swaddling clothes, which reminded one of the attempts of a rural dressmaker to revive the full-skirt style of 1860. A few color combinations noticed were Genistas in bronzy-yellow paper, with pea-green ribbon shown against the glaucous foliage; pink Azaleas surrounded by broad ribbons of the bright shade known as American Beauty, and dull purple-flowered Rhododendrons shrouded in long gowns of white crêpe secured by belts of dull purple ribbon. Occasionally the better taste and deft hand of some woman was seen, as where long boxes containing single yellow narcissus with rich blue-green foliage were simply covered with a band of yellow paper and a spare use of yellow ribbon of the same shade to match the flowers. Carnations were in meagre supply, one dealer, for example, being able to secure but 7,000 flowers to fill orders amounting to 10,000. Prices for these flowers ranged from \$1.00 to \$2.00 a dozen for the ordinary sorts, \$3.00 being asked for the popular Helen Keller.

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The Tree Palms of the United States.

A NUMBER of Palm-trees live on the southern borders of the United States, adding special interest to the forest flora of this country, which, rich in many forms of the common trees of the northern hemisphere and in many special and peculiar types, is extraordinary in the variety of its composition and in the size and beauty of its individuals.

Of these Tree Palms of our country the best known is the Cabbage Palm, or Cabbage Palmetto (*Sabal Palmetto*), of the coast region of the south-eastern states, where in the immediate neighborhood of the sea it ranges from an island off the mouth of the Cape Fear River in North Carolina to southern Florida, and along the Gulf coast to the Apalachicola. This tree is interesting to botanical geographers as the most northern arborescent Palm in the world; and probably nothing so delights and instructs northern travelers in the south as their first introduction to a grove of these plants. The large terminal leaf-bud of this tree and of many other Palms is cooked as a vegetable—a fact to which it owes its common name. The custom is an extravagant one, as the removal of the bud, which is never replaced, kills the tree, and as young vigorous trees produce the most succulent buds it is rather remarkable that the species has escaped extermination in a region abounding in negroes who are credited with a special fondness for cabbages which can be had without agricultural forethought or labor. But if it has survived the vegetarian it will not long survive the maker of scrubbing-brushes, who now uses the fibres of the sheaths of the young leaves in his industry. To obtain his material the top of a young plant with its bud is cut off, trimmed down to a disk of about eight inches in length, and then, after the soft edible core has been removed, boiled to separate the fibres. The removal of the top kills the plant, as we have already said, and as one concern in Jacksonville, Florida, alone consumes 7,500 buds a week, the time is not very far distant when the *Sabal Palmetto* will become a rare tree. The buds, which are now mostly procured from the west coast of Florida, where the Palmetto is most abundant, are worth at the mill only six or seven cents each, and it is not probable that the extravagance and wastefulness of this brush

industry is exceeded by that of any other in the United States.

A rude stockade made of the stems of the Palmetto on one of the islands in Charleston harbor, and manned by less than a hundred Americans under Moultrie, repulsed, on June 28th, 1776, Sir Peter Parker's British fleet and decided the fate of the Carolinas. A year later South Carolina placed on her official seal, in memory of this victory, a Palmetto erect, emblematic of its strength, and below it an Oak-tree torn from the ground and shorn of its branches to recall the fate of the oaken ships of her oppressors; and the Palmetto state took her place in the Union. In these days the trunks of this Palm are found as serviceable against the attacks of the teredo as they were in withstanding British shot, and make excellent wharf-piles for our southern coast.

A second arborescent *Sabal* enters our territory. This is *Sabal Mexicana*, a tree which is widely scattered along the Gulf-coast of Mexico and, crossing the Rio Grande, follows its Texas bank for a distance of some thirty miles from the coast, growing to a height of fifty feet on the rich bottom-lands of the river, where it is associated with the Texas Elm, the Texas Green Ash, the Mimosa and other trees peculiar to that region. In habit it resembles the Carolina Palm, but the leaves are rather larger, the flower-clusters are three or four times longer, with stouter branchlets, and the seeds are more than twice as large and much darker in color. In Texas the leaves of this tree are cut off almost as fast as they appear, being highly prized as thatch for buildings. It is occasionally planted as a street tree in the towns along the lower Rio Grande, and in some of the Mexican states this *Sabal* is regularly cultivated to produce leaves from which cheap straw hats are made in great quantities.

The third of our arborescent Palms inhabits the Colorado Desert in southern California. Found by the Jesuit missionaries, who settled in California, on the low shores of the depression of the desert which once held the waters of a great arm of the sea, the *Washingtonia* was taken to decorate the gardens of their southern missions. Some of these mission trees have now grown to a great size, and not long ago two of them standing near an old well in San Pedro Street, Los Angeles, were nearly one hundred feet in height, with trunks nine feet in diameter at the base. Specimens of such a size are rare, and on the desert and in the dry mountain cañons which this species selects for its home, and where it is subject to the constant hardship of drought, wind and fire, it is rarely more than fifty or sixty feet tall. Nature, in thatching the trunk with a thick cone of dead pendent leaves extending from the base of the living crown of foliage nearly to the ground, has furnished *Washingtonia* with the best possible protection against the drying winds of the desert. But, unfortunately, this thatch, which becomes as dry as tinder, is very inflammable, and usually falls a prey to the fires of Indians who find that it prevents them from climbing the tree to gather the fruit, or of untaught white men who enjoy the sight of the mass of dead leaves disappearing in a flash of flame. The tough outer rim of the trunk, fortunately, does not burn easily, and through uncounted ages *Washingtonia* has survived hardships of environment and the vandalism of man from a time, perhaps, when its broad and splendid crown of foliage was reflected in waters which have disappeared with its less robust and enduring forest companions. But, whatever may have been its history and its hardships in the past, the lines of *Washingtonia* have at last fallen again in pleasant places, and, nourished by the waters of limpid mountain streams, it is growing now in countless thousands in all the gardens and parks of southern California; and in all the countries of southern Europe this lonely denizen of the desert has become a rival in stately beauty of the Palms of every semitropical country.

Washingtonia is now known to contain a second species, an inhabitant of western Sonora and Lower California, and very like our California tree, except in some unimpor-

tant botanical characters and in its more slender habit and smaller size. First considered a species of *Pritchardia* by Wendland, the German authority on Palms, our California Palm was afterward made the type of his genus *Washingtonia*. Some later students of the Palms have now united *Washingtonia* again with *Pritchardia*, but the structure of the flower with its free stamens, the armed petioles, and its geographical distribution appear sufficient grounds for considering *Washingtonia* generically distinct.

The two Sabals and the *Washingtonia* are the only Palms which belong to the flora of North America, and one of the Sabals, which only just enters our territory, is really Mexican. The other arborescent Palms in the United States are all tropical species and are confined to the shores and keys of the extreme southern part of Florida which are covered by a purely tropical vegetation, and where three genera are represented.

The first of these is *Oreodoxa*, an American genus of about four species. Three are lofty trees, the loftiest, perhaps, of all the American Palms, and true princes of the vegetable kingdom, while the fourth is a humble inhabitant of the high slopes of the Andes of Ecuador, only remarkable as one of the most alpine of all Palms. The largest species, *Oreodoxa oleracea*, the Cabbage Palm of the Antilles, sends up a slender trunk nearly two hundred feet in height, surmounted by a long, green, polished cylinder of petiole sheaths and a crown of long, arching, graceful, pinnate leaves frequently twenty feet long and six feet wide. Its tall pale stem and beautiful head make this Palm a favorite in gardens, and it is planted in all tropical countries and often in long and stately avenues, as in the Botanic Garden of Rio de Janeiro, which owes its fame to its Palm avenue. Economically, *Oreodoxa oleracea* is one of the most useful of the American Palms. The bud of young leaves, like that of the Palmetto, is eaten as a vegetable; the sheathing bases of the leaf-stalks, which are eight or ten feet long, are used by the negroes as cradles, and are split into surgeons' splints; from the inner coat of these sheaths vellum-like paper is made, and mats are manufactured from their fibres. A kind of sago is obtained from the pith of the stem, and oil is pressed from the seeds. The long stems are split longitudinally and, freed of the spongy interior, are used as gutters, while from the hard rind-like exterior rim beautiful canes and many small objects are made. Another West Indian species, *Oreodoxa regia*, the Royal Palm, is a tree often one hundred feet high, with a trunk which is often largest near the middle, but otherwise generally resembles the Cabbage Palm and is equally graceful and beautiful. This species, which is common in Cuba, extends into southern Florida, where it inhabits two or three hummocks on Rogue's River, about twenty miles east of Caximbas Bay on the west coast, Long's Key and the shores of Bay Biscayne near the mouth of Little River. The presence of a lofty Palm in southern Florida was hinted at more than sixty years ago, and the fact is mentioned in the preface to Nuttall's *North American Sylva*, but it was not until 1859 that this Palm was known to be *Oreodoxa regia*. In that year Dr. Cooper found it on Bay Biscayne, and twenty years later Mr. A. H. Curtiss established the fact of its presence on Rogue's River and Long's Key.

The portrait of a young tree of this species near the shores of Bay Biscayne appears in our illustration on page 155 of this issue. It is made from a photograph for which we are indebted to Mr. James M. Codman, of Brookline, Massachusetts; and, although it does not display the loftiness of the full-grown tree, it shows the slender stem and graceful head of the most beautiful of the Palms of the United States.

The next genus, *Pseudophoenix* (see vol. i., p. 353, fig. 55), is monotypic and confined to two of the southern keys. It is a small and not particularly handsome tree, with long, arching, pinnate leaves and large orange-scarlet, usually three-lobed, fruits. The flowers of this species, of which there are probably not more than two or three hundred

individuals in existence, unless it grows elsewhere than in Florida, are still unknown.

The last of our genera, *Thrinax*, is exclusively West Indian and Floridian, with a few species of small trees and shrubs distinguished by large handsome fan-shaped leaves often silvery white on the lower surface, minute flowers, with calyx and corolla confluent into a short cup, and small fleshy or dry fruits. The Florida species are not well known, and there are probably four arborescent species on the keys, although at present no other North American trees are so little known as this group of Palms.

At a recent meeting of the West Virginia Academy of Science a committee was appointed consisting of Dr. A. D. Hopkins, Chairman; Dr. J. L. Goodknight, President of the West Virginia University; Dr. J. A. Myers, Director of the West Virginia Agricultural Experiment Station; Judge Okey Johnson, Dean of the Law Department of West Virginia University, and L. C. Corbett, Professor of Agriculture and Horticulture, West Virginia University, to inquire into the subject of forest protection, and draft bills for the establishment of a system of forestry reservations in the middle Alleghenies; the bills to be submitted to Congress and the state legislature.

The committee state that by referring to a map it will be seen that there is an area in the middle Allegheny Mountains, principally in West Virginia, but extending through a portion of Maryland and Virginia, and into Pennsylvania and North Carolina, in which the sources of a number of important rivers are found, namely, the Monongahela, with its tributaries; the Elk, Gauley, Guyandotte and Big Sandy, all of which belong to the Ohio River system; the principal tributaries of the Potomac and James, and also the source of the Tennessee River. In addition to this important system of river sources, the region embraces possibly a million and a half acres of virgin forest, with a considerable area of cut-over brush and waste land. Much of the continuous forest area lies in large bodies, and consists largely of Black Spruce, Hemlock, White Pine and valuable hardwood timber, making it a region of extreme importance, not alone to the states in which it occurs, but to the entire region drained by the several rivers mentioned, embracing a large portion of the United States east of the Mississippi River.

It is, therefore, evident that the protection of the forests in this region is a matter worthy of consideration by the Secretary of the Interior, the Forestry Inquiry Commission of the National Academy of Science, the Rivers and Harbors Committee of Congress and the Representatives in Congress from West Virginia, to whom resolutions have been sent reciting the dangers to the forest and recommending prompt action.

The committee further states that it will hold itself in readiness to furnish, as far as may be, any information regarding the region embraced in West Virginia, and will gladly coöperate with other academies of science, scientific and forestry associations and individuals, in obtaining and presenting facts bearing upon the subject. We need hardly add that we are in full sympathy with this movement. This journal has repeatedly advocated the establishment of a reservation to preserve a portion of the southern Appalachian forest, so rich in the variety and magnitude of its trees and so incalculably valuable from its position.

Some Native Ornamental Grasses.—I.

IN the temperate zone grasses are, next to forests, Nature's chief decorative material. With them she covers the dark earth and colors half the landscape. But apart from their æsthetic value when growing together in meadow or greensward, individual grasses have a beauty that is not half appreciated. For grace of form and delicacy of coloring many of our native grasses are full worthy of cultivation, although but few of them have received the

attention of the horticulturist. To many gardeners *Arundo Donax*, *Miscanthus Sinensis* (*Eulalia Japonica*) and *Pampas-Grass*, all foreigners, represent the sum total of what is beautiful among these plants. *Ribbon-Grass*, *Phalaris arundinacea picta*, is occasionally seen in old gardens. *Hair-Grass*, a species of *Aira*; *Quaking-Grass*, a species of *Briza*; *Sea Oats*, *Uniola paniculata*, and *Hare's-tail*, *Lagurus*, are still sometimes grown for "winter bouquets." Some small grasses are now and then used for edgings. With these the list of widely cultivated ornamental grasses is practically closed. But any one who keeps his eyes open may find about him, in field and swamp and woodland, species quite as handsome as any of these and as worthy of a place in garden and lawn.

There are some strikingly ornamental species of *Crown-beard* or *Broomsedge*, *Andropogon*. The *Silvery Broomsedge*, *A. argyræus*, common in dry fields in the southeastern states, is one of these. With its heads of silvery white bearded spikes, it is a very showy grass. *Indian-Grass*, or *Wood-Grass*, *A. nutans*, is another species that might, with cultivation, lend itself to decorative purposes. It is often met with in glades and along the edges of woods. In autumn the tall, straight stems bear handsome open panicles of silky brown spikelets. These grasses are relatives of the *Indian A. squarrosus*, whose root-stocks furnish the aromatic perfume, *vitivert*. None of our native *Broomsedges* appear to have this quality, although a member of a related genus, *Elionurus tripsacoides*, found in low *Pine-barrens* along the Gulf coast, has the *vitivert* fragrance. Another species of *Elionurus*, *E. barbiculmus*, is a pretty grass, native of the arid uplands of the far south-west. It has fine thread-like leaves in tufts and slender bright white hairy spikes.

Nearly all the species of *Erianthus*—a group related to the sugar-cane—are handsome plants. The *Old World Erianthus Ravennæ* is sometimes seen in cultivation. There are several in the south Atlantic and Gulf states, growing mostly in swamps. *E. alopecuroides* is the largest of these, while *E. contortus*—so named from its twisted awn or beard—is, perhaps, the most beautiful. It is a tall grass with a dense, pinkish panicle, which has a silky lustre due to the soft hairs on the spikelets.

Gama-Grass, *Tripsacum*, is a large plant of the eastern United States, more common southward. It has tall culms or stems and broad, ribbon-like dark green leaves resembling those of *Indian Corn*, to which it is close akin. It was formerly much esteemed as a forage-producer. The "head" is rather curious than beautiful, consisting of one to three spikes, which are very hard when ripe and break up into several joints. In the southern states it is often planted in cemeteries.

Indian or Tuscarora Rice, *Zizania aquatica*, sometimes known as *Water Oats*, is common on the muddy banks of tidal rivers near the Atlantic and about lakes and ponds in the north-west. The fruits are much relished by water-fowl of various sorts, and the seeds are on that account often sown. As it is a large showy grass, and of a decidedly odd appearance, it is very suitable for planting about artificial lakes. Another grass worth cultivating in such places is the *Catch-fly Grass*, *Leersia lenticularis*, a near relative of rice. It is a native of deep swamps in the southeastern states. The broad leaves are often striped with white, as in *Ribbon-Grass*. The round, flattened spikelets are fringed with stiff bristles like those on the leaves of *Venus' Catchfly*. To this resemblance, rather than to any ability of its own to capture insects, it doubtless owes its popular name. *Carolina Water-Grass*, *Hydrochloa*, inhabits pools and streams in the *Pine-barren* region of the south Atlantic and Gulf states. The slender stems root in the mud at the bottom, while the short leaves, purplish underneath, float on the surface. At flowering time the whitish spikelets are thrust above the water. This grass has flowered in the ponds of the Fish Commission at Washington and might be grown in ornamental pieces of water, though it would probably not prove hardy much farther northward.

As one of the few purely aquatic grasses it is something of an oddity.

The *Triple-awn Grasses*, *Aristida*, are often of very attractive appearance. One of the showiest is *A. spiciformis*, a denizen of *Pine-barren* swamps near the coast from North Carolina to Florida. It has a conspicuous spike-like head, densely bearded with pale green awns. *A. purpurea*, abundant in the prairie region, is a handsome plant with very long purple awns. The related *Feather-Grasses*, species of *Stipa*, are nearly all of them ornamental. In New Mexico and Arizona occurs a variety of the *Old World Stipa pennata*, the true *Feather-Grass*, which has its long bent awns beautifully plumed, like the tails to the fruits of *Clematis*. *S. Kingii* is a singularly delicate little grass, and *S. Richardsoni* is remarkable for the grace of its panicles. The best known of the *Feather-Grasses* is the *Porcupine-Grass*, *S. spartea*, whose long-awned, sharp-pointed seeds do great injury by working into the flesh of sheep. *S. viridula robusta*, a tall plant with a long greenish panicle, is widely known in the west as *Sleepy Grass*, and is said to act as a narcotic poison upon stock eating it.

Department of Agriculture, Washington, D. C. T. H. Kearney, Jr.

Alpine Plants and some of their Peculiarities.

THE vegetation which thrives on high altitudes, whether on the Swiss Alps, the American Andes, the Himalayas or on the mountains of Oceanica, shows a distinct personal character, noticeable even to the most indifferent of travelers. There plants are usually stunted, short-stemmed or stemless, with flowers relatively exaggerated in size, whereas on the plains, tall herbs with highly developed and luxuriant foliage bear insignificant blossoms, generally smaller than the leaves. On the mountain tops everything is different, the large flowers are almost sessile, with scarcely apparent and only slightly developed foliage, which at a very high level is often clothed with a fine close down, so as to better withstand the effects of cold nights. In many cases the foliage is glabrous, when it is also usually coriaceous (with tissues especially adapted to resist the frosts of alpine climates), and the leaf of a firm, close, thick texture is provided with a solid epidermis and covered with a waxy coating which enables it to withstand the effects of the sun as well as those of an excess of humidity.

Species that grow in the shade and in well-protected spots show neither the one nor the other of these characters. Their foliage is soft and delicate, whereas such woolly plants as the *Edelweiss*, several species of *Senecio*, *Artemisia*, etc., as well as species having smooth, generally thick and glossy leaves, as, for example, the *Alpine Azalea*, *Azalea procumbens*, and the *Alpine Rose*, *Rhododendron ferrugineum*, are usually encountered on arid, unsheltered slopes. Another fact soon noticed is, that while the flora of altitudes exposed to the heat of the sun generally produces large, brilliantly colored flowers, that of shady situations on the contrary shows very small, pale blossoms, often entirely out of proportion to the size of the plant. The influence of the sun and its effect on vegetation is here more striking than elsewhere.

Annual species, so abundant at lower levels, are but rarely met with on alpine zones. There the very short summer granted to them will not permit of their accomplishing the complete cycle of their existence in a single season. The only alpine species that are not perennial are a few species of *Pedicularis* and some of the *Gentianaceæ*.

Alpine plants are always branched from the base, with perennial root-stock and stems spreading on the ground, from which the plant seems to seek the much required protection against the inclemency of the nights and the severe days that are but too frequent during the short summer that is accorded to them. Species that on the plains form shrubs, and even majestic trees, are represented on the mountains by dwarfed ones, which decumbently spread, often rise only a few inches above the ground. *Salix*, *Azalea procumbens* and *Betula nana* are good illustrations of the stunting effect of alpine climate. The presence of curiously constructed little plants is often noticed along the fissures of rocks, small round cushions, composed of a multitude of tiny rosettes closely crowded together and covered with minute imbricated leaves that perish through the winter, and during the flowering season are so densely covered with a profusion of sessile corollas that the foliage entirely disappears under the wealth of flowers. In the clear light of our Alps these tufts of brilliant blossoms produce a marvelous effect, enlivening the rocks and arid sands

and giving a unique aspect to the vegetation of our mountain summits.

All the activity and energy of the plant is brought to bear on the development of the flower with its reproductive organs. It is easy to understand, considering the conditions under which they thrive, that alpine plants should require sometimes several years to accomplish the cycle of their existence and that they need more than a single season in which to produce flowers and seeds. I have devoted much time and care to the study and observation of the gradual growth of alpine plants, and I am sure that certain large tufts of *Androsace Helvetica* and *A. pubescens*, for example, have had more than a hundred years of life. It is not hard to realize that the difference of climate should materially alter vegetable forms. Our humid, relatively short and warm winters, with the slow intermediary spring season, followed by a hot dry summer, admits of the gradual development of stems and leaves, and forms a violent contrast to the climate of higher regions. There the winter lasts nine months, or often more (as in certain narrow valleys which are filled with snow frequently for years at a stretch), and is followed suddenly by a short summer that is in every way entirely favorable to rapid vegetable growth. As soon as the snow melts, owing to the influence of the foehn, the sirocco or other warm currents of air usually prevalent in the mountains, the tawny color of the old decaying vegetation changes rapidly in a few days, sometimes in a few hours, to a brilliant green. As if by enchantment, the fields and rocks become animated, are clothed with verdure, and everywhere the beneficent fertilizing insects busy themselves over flowers which, without their friendly interference, would remain sterile. Some plants are so impatient to unfold their blossoms that they cannot wait for the melting of the surrounding snow, but push their flowers up through it, piercing it easily, thanks to the dark color of their stems. This is often observed on alpine pastures in the cases of *Soldanella* and of the *Crocus*. But one question how can that be if the plant has remained dormant for eight or nine months. To which the answer is, that the plant has been far from inert during the winter, because, if it were so, it could not survive. Life and action continue, sap and juices move, but slowly, and the plant undergoes a gradual growth, the proof of which is as follows: On the eastern slope of the Jura I have studied a tuft of *Soldanella* for some successive seasons. My first observation was made during the last of October, as the winter was about to set in, and the next day snow was falling rapidly, preparatory to covering the ground for six long months. The little plant had reached maturity, its sap was retreating into the roots and it seemed about to die. At the first note of spring-time I returned to the locality and carefully brushed the snow from the spot noted the preceding fall, and found the plant alive, showing flower-buds, though still very small, in the centre of the little tuft. It had developed its buds in the same way that the trees on the plains do theirs even during the most rigorous of winters. The life of the plant is not reduced to as dormant a state as is generally supposed to be the case, which the breaking through of the snow by the early flowers of the *Soldanella* and the *Crocus* readily goes to prove. As is well known, the activity of the roots (and those of alpine plants are very numerous) is concentrated almost exclusively on the reproductive organs. The development of the foliage, which contains the organs of respiration, is generally remitted to the latter part of the summer, during and after the maturity of the seeds. After the long winter's rest the plant enters into a prodigious and astonishing activity. The summer days are of fourteen or even of sixteen hours of consecutive duration of intense pure light; the sun is hotter there than at lower levels and water is plentiful, whether in liquid form or in that of vapor. An abundance of light, an adequate amount of humidity and a profusion of roots and rootlets are the sources of life that keep these little plants in action.

Let us now examine the conditions that cause the dwarfing of alpine plants. In the first place, physiological experiments have proved that it is during the night that the lengthening of tissues and the gradual expansion of the plant occurs. In the daytime, the greater the insolation, the less growth they accomplish, and the alpine night being so extremely cold, there can scarcely be a question of nocturnal development of mountain plants. It is under the influence of attenuated solar rays and during the warm dusks that the plants are able to increase. The powerful, exceedingly hot sun of high altitudes causes the brilliancy and size of the corollas, but also prevents the equal expansion of stems and leaves. These latter have only the very short space of time between the setting of the sun and the beginning of the glacial night for their growth, and consequently they also profit by the short, cloudy, moist and tepid

days that precede the setting in of winter to put forth new leaves and buds. This is the general rule, though there are scattered exceptions to it.

The flora of polar countries has a very different aspect from that of our mountains, though it has many species common to both. There the sunlight is less intense, as well as more constant, lasting as it does for half of the year, but it is also more diffuse, the solar rays being forced to pierce a much thicker atmospheric stratum, and consequently the stems of plants are more highly developed, floral colors are paler, the foliage is less rigid and thick, and the blossoms are smaller.

I have preserved in my herbarium some specimens of plants common to both arctic and alpine regions, and the same species show a very different form as found growing in the Swiss mountains and in the boreal zone. *Silene acaulis* with us is truly stemless and the flowers are sessile, while in Lapland the name no longer applies, as there the much smaller flowers are borne on peduncles measuring as much as ten centimetres. There are also other causes that go to explain compression of form in the vegetation of higher altitudes. Extreme violence of storms and winds would destroy anything that did not cling close to the soil, and icy nights force the plants to seek shelter from the earth, which retains more heat than the air. Later the extreme dryness of the atmosphere again obliges them to look for protection from the ground, as the heavy dews that provide the necessary amount of humidity required for their existence are preserved in its light and porous soil. This same mountain soil is entirely different from that of the level country, and is light, very porous and composed of decayed vegetation and the pulverized rock common on the mountain. That rock, whether calcareous or granitic, gives a chemical character to the earth that greatly influences the plants which thrive on it. There is a flora of granitic regions, another of calcareous or siliceous regions, and that especially so on high mountains, as the alluvial soil of the plains is too great a mixture for any appreciable influence to be felt.

Director of the Alpine Garden at Geneva.

H. Correvon.

Foreign Correspondence.

London Letter.

CALPURNIA AUREA.—This is the Natal Laburnum of residents in south Africa, with whom it takes the place of the common Laburnum of gardens in more temperate regions. It has been in cultivation in a sunny greenhouse at Kew for the last ten years, and is now a small tree about nine feet high, with the habit, foliage and flowers of the common Laburnum, the main difference being in the smaller flowers of the Natal plant. For countries where the temperature is too high for the common Laburnum the *Calpurnia* would be valuable. It grows freely from cuttings.

CYTISUS PROLIFERUS is a shrub indigenous to the Canary Islands, of which seeds were distributed from Kew in 1879 to Australia, India, etc., on account of its leafy branches being useful as fodder. "Its great value is manifest from the fact that it requires no irrigation, that it can grow in comparatively barren land and that its branches can be cut off three times during the year, resisting perfectly well a long dry summer." Sheep are said to be very fond of it and to thrive well when fed upon it; it is also reported to be good for and relished by cattle and horses. In Australia it is said to feed animals into condition more rapidly and in a greater degree than any other food except corn, and it grows rapidly in any kind of soil, growing to a height of twelve feet or more in four years from seed. It flowers freely from May to September and is a favorite with bees. Dr. Schomburgk wrote in 1891 that he "considered it to be one of the most valuable trees ever introduced into Australia." Plants of it are grown at Kew for the decoration of the conservatory. Here it forms a copiously branched elegant shrub six feet high, not unlike the common *C. racemosus*, except that the branches are longer and stiffer and they are clothed in spring with paper-white flowers.

CAMELLIAS as hardy shrubs are receiving attention in the south of England, where they are proving as hardy as the common Laurel and as floriferous as the Pontic *Rhododendron*, so that the leading nurserymen in Devon and Cornwall are working up large stocks of them. At Kew they are hardy, and this year they are flowering well. *C. re-*

ticulata, the Pæony-flowered species from the mountains of Hong Kong, is thriving in the open against a wall. We have only lately awoke to the value of *Azalea Indica* as a hardy shrub, and the *Camellia* bids fair to accompany its coun-

time in our southern states. The white *Azalea Indica* has proved hardy, with proper care, in the latitude of this city.—Ed.]

RHODODENDRON, OTTO FORSTER.—This is a hybrid between



Fig. 21.—*Oreodoxa regia*, in Florida.—See page 152.

tryman in its migration from the greenhouse to the open air.

[Those who have seen the great *Camellias* in the old gardens at Drayton Manor, near Charleston (see vol. ii., p. 129), can realize the splendor of these trees at flowering

Rhododendron Veitchianum and *R. Edgeworthii*, two of the most distinct of the Himalayan species. It was raised a few years ago by Mr. O. Forster, of Lehenhof, Austria, from whom plants of it were secured for Kew, where it is

now in flower in the temperate house. It has inherited all the good qualities of the flowers of both of its parents and none of their bad qualities of habit. It forms a shapely shrub four feet high, clothed with dark green, wrinkled ovate leaves, and bearing loose clusters of large elegant pure white fragrant flowers. Among the hybrid Rhododendrons grown for the greenhouse I should place this by the side of Countess of Haddington, Henryanum, Kewense and fragrantissimum.

RHODODENDRON NOBLEANUM.—This and its near allies, *Rhododendron altaclerense* and *R. Russellianum*, all three hybrids between the Himalayan *R. arboreum* and forms of *R. Catawbiense*, have been beautiful here since the middle of January. They were raised in England more than fifty years ago, and for a long time they were in great favor, but they have long been supplanted by later-flowering hardier sorts. In a mild winter, however, such as the past has been here, they are a most attractive feature of the Rhododendron garden, the Kew plants, for instance, having been so full of beautiful flowers that horticulturists generally have wondered why such handsome winter-flowering shrubs are not in every garden.

RHODODENDRON FULGENS.—This is one of the most beautiful of the Himalayan Rhododendrons and one of the hardiest. It forms a somewhat scraggy bush, six feet high at Kew, sixteen feet in the Himalayas, with smooth purplish bark, elliptic rounded leaves dark green above, the under surface covered with rust-colored tomentum. The young growths are enclosed in strap-shaped imbricating dark red scale-leaves. The flowers, which are bell-shaped, are in dense heads six inches across and each flower is about an inch across and of the brightest glistening blood-red color, unequaled in brilliancy by any other Rhododendron. I am informed that on the high mountains of Sikkim the effect produced by the numerous bushes of this Rhododendron when in flower is indescribably brilliant. There are several big bushes of it in full flower out-of-doors now at Kew. Unfortunately, there is a close resemblance between this species and the comparatively worthless *R. campanulatum* (*ærginosum*), except in the flowers, and this resemblance has led to the latter being generally grown for *R. fulgens*. So far as I know, this species has not been used by the breeders of garden Rhododendrons, although in its hardness, rich color and time of flowering its claims are superior to other species which have.

RHODODENDRON PRÆCOX.—In favorable springs, such as that now being experienced in England, this Rhododendron is exceptionally effective, producing in great abundance its compact heads of rosy-lilac flowers in February and March. The habit of the plant is not unlike that of the Swamp Honeysuckles, and it resembles them in being practically deciduous. It is a garden hybrid between *R. Dauricum* and *R. ciliatum*, and was raised about thirty years ago by Isaac Davies, of Ormskirk, in Lancashire, to whose skill as a breeder of Rhododendrons we are indebted for some of the best in cultivation. *R. præcox* is as hardy as the hardiest of shrubs, and it a handsome bush when clothed with its glossy green Myrtle-like leaves. Its only drawback is its early-flowering habit, the buds unfolding in February, when they are often destroyed by frost. Where it cannot be grown out-of-doors permanently it is worth a place among greenhouse plants, a few bushes grown in pots in the open air during the summer and protected from severe cold till midwinter, when they may be started in a little heat, being very useful for the decoration of the conservatory in February.

PRUNUS MUME.—This plant, said to have been introduced from Japan into France twelve years ago, but as yet scarcely known in gardens here, is this year very attractive at Kew, the flowers being as large as those of the Almond, of the same color and deliciously fragrant. It is distinguished by the pale green color of its twigs, the long pointed Apricot-like form of its leaves, and its globose, slightly velvety fruits, containing oval convex stones. When in flower the shoots are quite leafless. It is quite

hardy and flowers a fortnight earlier than its ally, *P. triloba*. The flowers are semidouble. It was distributed by Messrs. Baltet Brothers, Troyes, under the name of *P. myrobalana flore roseo plena*, and it has also been called *P. cerasifera*. The Japanese nurserymen offer named varieties of it, with flowers varying from white to rose-purple. It is said to force well.

PRUNUS DASYCARPA, the Black Almond, is also flowering freely this year. It is supposed to be a garden hybrid. The twigs are black, and the flowers, which are an inch across, are white, with rose-tinted stamens and reddish calyx lobes. It seems to be a good, early spring-flowering tree.

PRUNUS TRILOBA.—An old plant of the double-flowered form of this grand Plum has, for many years, been one of the principal attractions among trees which blossom in early spring at Kew. It is trained against a south wall, where it makes hundreds of wand-like shoots every year, each about a yard long and clothed from base to apex with clusters of rosy pink flowers over an inch across, double, beautiful both in bud and when fully expanded, their beauty being enhanced by the bright green of the budding leaves. It is impossible to speak too highly of this plant as a shrub for a south wall, for, although it is quite hardy and flowers freely when treated as an ordinary bush or tree, it is never so beautiful as when grown against a wall. The Kew plant is on its own roots. After flowering all the shoots are cut back hard, and this induces the plant to make long new shoots as above described. We have no more beautiful Plum from the east than this. It was introduced from China in 1857 and has been known in gardens as *Amygdalopsis Lindleyi*. Plants of the single-flowered form are also in cultivation, having been introduced from Japan by Professor Sargent a few years ago.

SPRING-FLOWERING SHRUBS.—The exceptional mildness of the past winter, followed by an unusually warm and sunny spring, has made gardens here more attractive than I ever remember to have seen them. Shrubs of all kinds have flowered profusely and earlier than is their wont, while the spring-flowering herbaceous plants have been wonderfully good. That grand shrub, *Forsythia suspensa*, has been wreathed in golden flowers everywhere; *Hamamelis arborea* has been equally prolific in bloom. All our first comers, which generally get nipped in the bud with frost, have been a success, such as *Rhododendron Dauricum*, *R. præcox*, *R. Rhodora* (now beautifully in bloom), *Corylopsis spicata*, *Magnolia stellata*, *M. Soulangeana*, *M. conspicua*, Plums, Almonds, Peaches of all kinds, *Prunus Davidiana*, which is better than ever. Roses are in full leaf, and the Lilac bushes promise to be in bloom in a few days. With bright sunshine all day and a temperature of seventy degrees in the shade on several occasions and the entire absence of frost, such a state of things in the garden in March is not to be wondered at.

London.

W. Watson.

Cultural Department.

Pruning Shrubs.

THIS is the season of frequent inquiry as to when and how deciduous shrubs should be pruned. To this it must be answered that the knife ought to be used at different times and in different ways, according to the object to be served, and that no branch should ever be cut away unless an intelligent reason can be given for removing it at that particular time. Every one ought to know that shrubs which bloom early in the spring form their flower-buds on the wood made the previous year, and that if this wood is removed now it will to that extent curtail the production of flowers. With a view, then, to the production of more flowering branches it is evident that such shrubs as the early *Spiræas* and *Forsythias* should be pruned as soon as the flowering season is over, and this will induce the growth of new wood, which will produce flowering buds for next spring. On the other hand, shrubs like the late-flowering *Tamarisks* and *Hydrangeas* should be pruned at once, if this has not already been done, in order to insure flowering wood for late summer and autumn, since these

plants blossom on the wood of the current year. But a shrub is more than a flowering plant. It is beautiful in summer for its foliage, and in the winter for its form and the tints of its branches, and it should be pruned, therefore, with a view to its continued use and beauty. *Althæas* and *Tamarisks* cut back to bare poles in the autumn have no beauty until midsummer of the following year. Severe pruning, as a rule, leaves a disfigured plant. Pruning shrubs to the form of a globe or a cone, or to a single level like a hedge is a horticultural atrocity. Remembering what has been said about the relation of the time of flowering to the time of pruning, it is best not to remove large branches to the extent of interfering with the typical outline of the plant. It is as good a time now as any to thin out the weaker and overshadowed branches and those which interfere with each other. Of course, this will not supersede the necessity of summer pruning. Suckers and surplus wood can be removed in the growing season, when the wounds will heal more quickly than in cold weather or when the plants bleed. When the flowering wood is shortened in after the bloom is over the overstrong shoots can be stopped in midsummer without injuring the shapeliness of the shrub, and this will hasten the development of the flower-buds and help to ripen the wood into good condition for the winter. This is especially true in wet seasons. If the luxuriant growth is then stopped the vital energies of the tree will be turned toward developing buds and fruit.

Hartford, Conn.

G. A. Henry.

Growing Tomatoes.

ON page 37 of the present volume of GARDEN AND FOREST will be found a most instructive article on cultivating the Tomato, by Mr. W. W. Tracy, of Detroit, in which he called attention to the habits and surroundings of this plant in its native tropics. Under natural conditions, from the time the seed germinates until the plant is exhausted by bearing fruit, there is not any check in its growth from chill or other untoward circumstances, and it has consequently acquired a constitution which resents any check. When, therefore, the plants are exposed to a temperature of forty-five degrees they not only stop growing, but they lose vigor and vital energy, even although they are not killed. This indicates the true method of cultivation which was clearly described by Mr. Tracy—that is, a thorough preparation of the ground beforehand by frequent stirring; sowing the seed as late as from the first to the tenth of April; keeping the plants growing steadily in a good cold frame and not setting them out until cold storms are over, which is not much before June 1st in his latitude.

In the current issue of *The Rural New-Yorker* Mr. Tracy cites some instances to show that this most reasonable theory works well in practice. A field of Tomatoes in Oakland County, Michigan, treated in the usual way—that is, with the seed sown in March, planted in rich ground in such a way that they were checked for about ten days, after which they commenced a rapid growth, so that they soon surpassed in size the plants in an adjoining field from seed sown three or four weeks later and set out in ground that had been cultivated several times in such a way that they received no check. In spite of the vigorous growth of the stalks and leaves, the first field yielded less than three hundred bushels to the acre, and the second yielded about eight hundred bushels of excellent fruit. Of course, there were differences in cultivation. For example, the second field was cultivated every week, and sometimes oftener, and care was taken to stir the surface only, while the other field was cultivated three times, as deeply as the implement would run. Nevertheless, this will not altogether account for the difference in the yield, and it appears plain that Mr. Tracy's suggestions will be found very useful to all who study them so that they can adopt the practice understandingly.

New York.

S.

Asparagus.

NO early vegetable is looked for more eagerly than the first dish of asparagus. A bed of *Asparagus* once established is permanent, and it is essential, therefore, that the work of preparing the bed should be done thoroughly. A well-drained sandy loam is best. Our location is a dry one, but we have never known the bed to suffer even in the driest season. In heavy soils some artificial means must be adopted to relieve the soil of excessive moisture. Where *Asparagus* is grown in the lowlands it is customary to cultivate it on ridges six feet wide, three rows to a ridge. The intervening hollows, or trenches, are filled during summer-time with the litter gathered from the manure which has lain on the ridges all winter. When

thoroughly decomposed this is thrown up again, with an additional dressing, and the trenches again left open during the winter. This plan will be a good one to follow in all heavy soils, and in such cases there is another advantage, that of having earlier *Asparagus* than could be grown in beds on the level. The beds being permanent, the ground must be deeply trenched with good loam to take the place of poorer soil. Six inches of good manure should be worked in deeply, as *Asparagus*-roots penetrate the ground for fully two feet, and this also is a safeguard against drought. It is not, however, recommended to make the plantation deep. Our original bed is now twenty years old, but it is equal in bearing and quality to plantations six years old. It is later, and this may be accounted for by the fact that crowns are yearly formed below, or behind, the main one, so that now the original roots, once near the surface, are from fifteen to eighteen inches deep.

Travelers in Europe often remark on the succulent quality and delicate flavor of asparagus as served in Paris, comparing American-grown as stringy and coarse-flavored. The French method of culture, to which alone is ascribed the excellent quality of the vegetable there, is described in Robinson's *Parks and Gardens of Paris*. A planting was made here six years ago according to the instructions given in this book, and with most interesting results. Trenches four feet apart were dug to the depth of six inches and the soil well pulverized. All along these, at three feet apart, mounds were made a foot in diameter and six inches high. The young plants were placed with their crowns on the top of the mound, and the roots spread in all directions along the sides, and finally banked up even with fine soil. This method of handling the roots is of considerable importance, and may be followed to advantage in any case. Regular development is insured, and the results in our case were surprising. It certainly is a more rational way than bunching the roots or squeezing them into holes that are not large enough for them.*

Each season the stems have been stayed with stakes to prevent the unavoidable injury from wind, liable to unprotected plants. In a closely planted bed this would not be necessary. Care was taken that these stakes were inserted far enough away not to injure the crowns. All seed capsules were picked off and everything done to secure the fullest development of the crowns. One, two, three years passed, and the hills were banked with fine soil to bleach the pushing shoots. But something was wrong, for the grass was stringy and tasteless, and the French method was abandoned. Nevertheless, for private gardens, whether one wants it blanched or not, finer and better asparagus can be grown in this than in any other way, and we would recommend it to all.

When the cutting season is past, which is usually when peas come in, we have given an additional coat of salt with no injury to the growing plants and with advantage in destroying millions of small weeds. There is an excellent artificial manure, specially prepared for top-dressing. In city gardens this will be preferable to barnyard manure.

Asparagus roots are sometimes lifted in the autumn and forced under benches in the greenhouse during winter. The results are seldom satisfactory, and the shoots are at best weak, stringy and tasteless. The plan adopted at the place of H. H. Hunnewell, Esq., and now in good practice, after several years' preparation, is to mark a bed out, which can be framed over when ready to force, and cover it with hot-bed sash. The bed is enclosed in the autumn, well matted and shuttered and banked, so as to exclude frost. When February comes, sunlight and air are allowed on all bright days, so that by the middle of March good, natural-looking heads push through, and these are as well flavored as any we get at any time. Cutting is continued until the open-air crop is well in, and then the bed is allowed to take its natural course.

Wellesley, Mass.

T. D. Hatfield.

Hovea elliptica.—New Holland plants are unfortunately little known or they would be very highly appreciated, and none more so than this one. The *Hoveas* are much like *Chorozemas* in many respects, but differ generally by having intensely purple or blue flowers. *H. elliptica* is of a rather straggling habit that can be improved under cultivation by means of pinching and pruning. The leaves are rather small, alternate, rounded-lanceolate, mucronate. The intensely blue and very beautiful flowers are produced in short axillary racemes in great profusion from March until early summer. The stems are very slender, with somewhat hairy branches, and grow a couple of feet high only, under cultivation. *Hoveas* are generally propagated by seeds, which grow freely when fresh. They

* The method of cultivating *Asparagus* in France was explained with great fullness by Monsieur Henri L. de Vilmorin, in GARDEN AND FOREST, vol. iii., p. 557.

should be sown in shallow pans in a compost of fibrous peat, loam and sand and kept in a warm and shady position until germinating. Watering should be attended to regularly and with great care, as the young seedlings are apt to damp off if the roots are kept too dry and the top too moist. The seedlings should be pinched frequently to form bushy plants, and kept in a moderately cool and light place in summer. In winter they thrive best in a warm greenhouse or conservatory.

Washington, D. C.

Mahernia glabrata.—This is a very desirable greenhouse plant, flowering from March until early in summer. It has a rather straggling habit, but can be grown into a neat and compact specimen by proper pinching and training. The Oxalis-like flowers are yellow, nodding, very fragrant and borne in pairs on long axillary or terminal peduncles chiefly on lateral branches; leaves lanceolate, pinnatifid, or coarsely toothed, and the stems are slender and wiry. The plants when well grown are very floriferous, and, although not among the showiest, they are, at least, among the sweetest greenhouse and window plants of this season. After flowering they should be allowed to rest and ripen, and any long and straggling shoots may then be pruned back. They should afterward be repotted and plunged during the growing period outside in a cool frame. Plenty of water is necessary in summer. In winter they should be kept quite cool until February or March, when a warm and light place near the glass is preferable to any other. Mahernias are generally increased in summer by means of cuttings of soft-wooded lateral shoots, which will strike in a cool propagating-bed in a temperature of about sixty degrees.

Kennedyia (Maryattæ) prostrata major.—Few twining greenhouse plants can surpass this showy species, which flowers very freely in March and April in a cool conservatory. It is the only really valuable and floriferous greenhouse climber among the Leguminosæ, and it deserves wide and general cultivation for its graceful habit and beautiful flowers. Like all *Kennedyas*, it is a perennial herbaceous twiner, a native of Australia, where the genus is indigenous. It differs from *K. prostrata* in having lighter-colored and larger flowers, in the more rounded and hairy leaflets, and in being profusely floriferous. The trifoliate leaves are very handsome, with roundish oblong wavy-edged leaflets about two inches long. The slender stems often grow as long as twenty feet and carry numerous axillary clusters of intensely deep scarlet flowers. All the green parts of the plant, stems and branches, as well as the foliage and stipules, are very hairy. All the *Kennedyas* are readily propagated from seeds, which ripen in any moderately warm and sunny position. They should be sown as soon as ripe in a light compost, and may be grown out-of-doors during the first season. They grow very rapidly and require an abundant supply of water in summer, but may be kept considerably drier in winter. They are best planted out in prepared beds in sunny positions in the conservatory, where they can be trained on pillars and rafters, producing the most beautiful effect in spring and early summer.

Newark, N. J.

N. J. Rose.

Correspondence.

The Plans of Madison Square.

To the Editor of GARDEN AND FOREST:

Sir,—All persons interested in park-making will certainly be grateful for the two plans of Madison Square in your last issue and the study of their comparative merits by Mrs. Van Rensselaer. Perhaps still further discussion may be helpful, and I therefore write to say that it is hardly correct to classify the old plan as belonging to the naturalistic class. I draw a heavy line (see fig. on this page) to show how symmetrical it is except where it has been distorted in two or three places. Curved lines are not necessarily natural. Of course, the building (C) ought to be less conspicuous than it is, and the revised plan corrects this. Plainly, too, the statues are introductions of a later date, and the original designer is not responsible for placing them where they are. They might be well removed to the points (NN). If this were done I do not discover any great superiority in the proposed plan over the old one. The area is so small that the insertion of a bit of rectangular treatment surrounded by a curvilinear treatment seems incongruous. Nor is it large enough for a "variety of design, abundance of shade, an effect of wide green lawns with seemingly unstudied, yet artistic, arrangement of trees, shrubs and grass, which produce pleasingly naturalistic impressions and illusions." An attempt to accomplish all this in so contracted a space must result in confusion. Let us have symmetry

where this is needed, but curvilinear symmetry and rectangular symmetry ought not to be mixed up in so small a place.

Mrs. Van Rensselaer has noted one serious mistake in the new plan—that is, the sharp points in the grass-plats—and she might have added that the few conifers introduced tend to

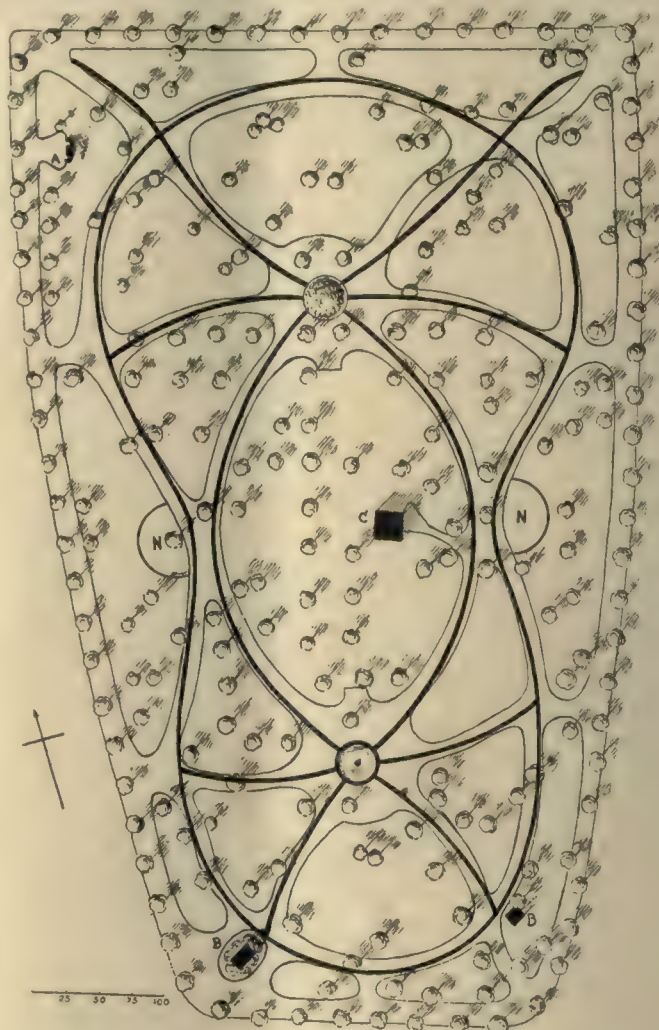


Fig. 22.—Plan of Madison Square, New York.

spottiness. Again, instead of dividing the rectilinear garden by a short straight avenue of trees running from circle to circle, would it not be better to surround and frame in the flower garden with them rather than bisect it? Perhaps trees are not needed at all, for the flowers need all the sunshine they can get. Mrs. Van Rensselaer is certainly right when she states that parks in restricted areas had better be formalized. But the central oval of the original plan might be adorned with flowers as advantageously as the central feature of the proposed plan, and the trees about this oval might be placed symmetrically and at even distances if it was thought proper to emphasize the symmetry of the centre of the place; and this would be advisable if the monuments were placed at the points (NN). Undoubtedly the trees in the old plan should be better grouped, or set in some symmetrical relation, and some symmetrical shrub arrangement is needed especially outside the central oval. With proper grouping of the trees symmetric places might be found for formal flower-beds and balanced sites for statues. Altogether, if there could be some rearrangement in the planting to make the symmetry of the present plan more evident, it strikes me as better than the new ones.

I should be greatly pleased to hear some other opinions on these points, and trust that some artist will furnish you with other plans designed without any regard to the square as it now exists. Messrs. Bell & Langton have been hampered by their efforts to save standing trees, so that they were allowed very little freedom of treatment, and it is not fair to criticise their plan as an original work.

New York City.

S. A.

To the Editor of GARDEN AND FOREST:

Sir,—I observe that in both plans of Madison Square, published in your issue for April 8th, the paths which converge at

the circles are very inaccurately centered—that is, the axes of the paths do not point to the centres of the circle, and if the designs were executed as shown on the map the result would be disastrous. This, however, may be simply carelessness on the part of the draughtsman. I should add that both plans ought to show greater seating capacity. Seats ought to be recessed so that the feet of those using them will not be in the way of pedestrians, because the paths as wide as those in the plans give no more than the necessary walking space.

New York.

L. G. S.

Meetings of Societies.

Forestry in Pennsylvania.

A NOTABLE event was the spring meeting of the Pennsylvania Forestry Association and Arbor Day celebration, which occurred in Philadelphia on Friday, April 10th, with the coöperation of the trustees and faculty of the University of Pennsylvania and the trustees and faculty of the Drexel Institute. The planting ceremony comprised afternoon exercises in the chapel of the University of Pennsylvania. Perhaps so enthusiastic an audience never before assembled in the interests of forestry in America. The Governor of the commonwealth, Mayor of the city, Provost and faculty of the University, chief of the National Forestry Division, the State Forest Commissioner, the president of the Pennsylvania Forestry Association and other public officials, the members of the Pennsylvania Forestry Association and friends of forestry and of the University made up part of the audience, but the impressive feature of the great gathering was the hundreds of earnest young men, students of the University. The spontaneous ringing applause when telling points were well made by the speakers was doubtless inspired by patriotism sometimes as much by protest against the wasteful destruction of forests or the proposal of forest reform, but the effect in the direction of wiser forestry policy was none the less strong on the minds of the audience.

Provost Harrison, in opening the meeting and giving it into the charge of Mr. John Birkinbine, President of the Pennsylvania Forestry Association, said that Pennsylvania once had the greatest relative forest area of any of the colonies north of Virginia, and now has the least relative forest area of the states north of Virginia, excepting Connecticut. Mr. Birkinbine explained that his interest in forestry was aroused in connection with the hydraulic and metallurgical factors in railroad building. Governor Hastings was then introduced, and spoke, among other things, of the far-seeing wisdom of Penn., who aimed at the planting and preservation of the Oak-trees for ships and of the Mulberry-trees for silk; of two rows of trees along every street of the city, and the clearing of only five out of every six acres of forest by the settlers. Mayor Warwick's fancies and facts completely captured the audience. He said much of Shakespeare's poetry was due to his having yielded to the influence of nature in the Stratford and Coventry country.

Professor Rothrock, State Forest Commissioner, then read a letter from General Paul A. Oliver, of Wilkesbarre, giving a history of the scion of the Penn Treaty Elm, to be planted in connection with these exercises on the University campus, as a memorial to William Penn. Some account is already recorded in GARDEN AND FOREST, vol. v., p. 312, and vol. viii., p. 240. The little tree to be planted now was taken from a shoot of the Oliver tree on the 1st of March, 1893. Nathan C. Schaefer, Superintendent of Public Instruction, made an effective address, and, describing the love of German students for trees about their alma mater, called upon the loyalty and care of the students of the University of Pennsylvania for this historic grandchild of a great tree.

Mr. Fernow, representing the National Government, said that the American people had made two great mistakes, one moral, the other economic; one in the treatment of the Indians and the other in the treatment of the forests, and that Penn., in whose memory this tree is to be planted to-day, made neither of these mistakes. He said the planting would be a memorial of moral rectitude and advanced national economic thought.

The planting of the trees on the campus facing the main hall then followed, Governor Hastings doing the actual planting. In the name and by the authority of the commonwealth of Pennsylvania, the Governor commanded Provost Harrison and the University generally to care for the tree. The Provost accepted the trust, and promised also that trees would soon be planted along the entire three miles of streets surrounding the University, the plans for the work being already in hand.

At the evening meeting, in the Drexel Institute, the first address was that of Governor Hastings, who spoke on the necessity of preserving the forests of Pennsylvania. After sketching

graphically the original extent and wealth of our unbroken Appalachian forests which stretched from Maine to the Gulf, he showed how rapidly these had melted away before the axe of settlers, whose descendants were continuing this destruction while other nations had been taught by a disastrous experience to begin with infinite pains and cost the work of forest restoration. Leaving aside the broader economic and sanitary value of our forests, he quoted figures to show that the annual product of our forests was fifteen times as great as that of all our gold and silver mines, and more than double that of all the minerals as well as the natural gas, and slate and building stone which are dug from the earth in a year. Coming to his own state, he said that during the last ten years the timber crop of Pennsylvania had aggregated more than two hundred millions of dollars. Three-fourths of the timber in the state had already been marketed, the railroads had invaded the woods where streams were not large enough to float the logs, and the portable sawmill was making havoc with the smaller growth on the hills and the wood-lots on the farms. He gave Commissioner Rothrock as authority for stating that if the land in Pennsylvania unfit for farm purposes, and now worth not more than \$1.00 an acre on an average, could be protected from the axe and the brand, the value of the timber crop on this land at the end of fifty years would be a billion and a half of dollars, or an average of thirty million dollars a year, and this estimate makes no account of the saving of life and property from frequent floods, or of the improvement to agriculture and other industries and the promotion of the public health, which would certainly follow. He asserted that these tremendous interests make it the essential duty of the commonwealth to restore and protect the forests on the highlands of Pennsylvania wherever this is possible. This great waste forest area should be under proper guardianship and no interest of such public importance should remain in private hands. It was the welfare of the people at large, pure water, public health, which forest destruction threatened. Altogether the Governor made a strong and reasonable plea for state action in the interest of the state at large.

In the course of a very instructive paper, Mr. B. E. Fernow, head of the Forestry Division of the Department of Agriculture, said that there are two points of view from which we may look at the forestry movement: first, the one which a thinking lumberman and forest-owner ought to take when he considers only the perpetuation of supplies of useful material which the forest can yield, and, secondly, the broader one which the statesman and every patriotic citizen is bound to take in addition to the first—that is, he must consider the rôle which the forest plays as a factor in our civilization, as a general condition of the country which, if irrationally altered, must lead to the misery of the whole community. The influence of the forest upon the conditions of river-flow, climate and health can rarely concern the private owner who is interested only in the profit which he can draw from his property, and this is the reason why the state, which alone is as long-lived as the forest, should guard the essentials of its future welfare. The questions relating to our forest are not those whose adjustment can be deferred without detriment. Whether our currency be of silver or of gold, whether our tariff be high or low, whether our products are carried across the sea by English ships or by our own merchantmen, are matters which can be decided in the future; but whether fertile land shall be turned into deserts, forests into wastes, brooks into torrents and rivers changed from means of intercourse and power into forces of desolation—these are questions of immediate importance which must be solved at the proper time. Mr. Fernow went on to show the particulars of the devastation of the French Alps and of the efforts to recover them. He explained that the same processes are wasting the fertility of our own territory, where vast regions are doomed to impoverishment unless we begin at once to arrest the loss. He advocated strongly the passing of the McRae bill, now before Congress, which, although crude and primitive, is, at least, a definite and reasonable attempt at a rational forestry system for the property of the General Government.

Dr. Rothrock, State Commissioner of Forestry, followed with some well-selected lantern views illustrating the conditions of the naked hills and water-sheds of the state. One of these showed a scene in Sullivan County where ridge stretched beyond ridge for miles covered with an unbroken forest, making a natural sanitarium, and this was contrasted with another which was a scene of absolute desolation where the hills had been first lumbered over and the remaining trees destroyed by fire. Two beautiful pictures from Centre County showed the sources of streams in timbered regions where water was saved for the state use, and two others from Clinton County showed scenes of ruin, where the water had rushed off in a

deluge from the naked hills, destroying life and property in its course. Instructive, too, were the contrasting illustrations of what a street-tree ought to be, and of an actual scene in one of the Philadelphia squares, in which trees unsuitable for a city planting had been selected and then butchered by an ignorant pruner.

All the addresses were wise and temperate, and the exercises throughout were instructive and stimulating, just such exercises, indeed, as are needed for popular education in all parts of the country.

Notes.

Plums proved the least satisfactory of all fruit crops in western New York last year, and the reason assigned was that the crop of 1894, the largest ever known, proved such a drain on the vitality of the trees that they did not have strength enough for a crop the succeeding year. A marked exception to this rule was found in trees of the old variety Reine Claude, which gave a full yield of as large and fair fruit as ever.

Of the vegetables imported into New York during last week, Bermuda sent 14,068 crates of onions and 1,346 crates of other vegetables; Cuba, 2,366 crates of onions and 440 crates of other products; the Bahamas, 871 crates of tomatoes. Other receipts from the south were 4,600 barrels of kale, 12,700 barrels of spinach, 7,750 crates of cabbage and 5,100 crates of other vegetables, while 8,500 packages came over the Pennsylvania Railroad. Of course, this is only a partial record of the supply.

Strawberries from Florida have been quite abundant, but the fruit is of irregular size and quality, though in fair condition. Some Hoffman seedlings of extra grade have come packed in ice boxes and sold at fifty to sixty cents a box, at retail. In other grades those carried in refrigerator cars have shown the best average quality, and prices have been thirty-five to forty-five cents a box at retail. Other methods of transporting this perishable fruit are in freight lots in small ice boxes and by express in open crates.

Bananas are in plentiful supply in this city and sell rather slowly. During last week 49,900 bunches were imported here, against 63,500 bunches during the corresponding week a year ago. They sell for eighty-five cents to \$1.35 a bunch on the docks in truck-loads. Cocoanuts, also, are plentiful—a cargo of 398,000 from St. Andreas having arrived a few days ago, besides the large stock on hand. San Blas, St. Andreas, Baracoa and Kingston are the forwarding ports, and prices here range from \$24.00 to \$30.00 a thousand.

A very complete handbook on Indian Corn is contained in the report of the Kansas State Board of Agriculture for the quarter ending March 31st of this year. It fills more than one hundred pages, and has been written by experts in the various fields, and contains a surprising amount of information upon such points as cultivating and handling the crop, harvesting and storing the fodder, the merits of different varieties, the feeding value of the meal, diseases of the plant, etc. This is followed by a briefer treatise on the Sorghums and their use both for grain and for forage as estimated by Kansas growers. It is a useful little pamphlet, and yet the Secretary of the Board of Agriculture has not found it worth indexing.

Some time ago we gave a brief description of *Physalis Franchetti*, a near relative of *P. Alkekengi*, often seen in old gardens, where it is called the Winter Cherry or the Strawberry Tomato, on account of its well-flavored fruit enclosed in the swollen calyx. The new species was brought recently from Japan by Mr. Veitch, and from a colored plate of it in the last number of *The Garden* it must be a striking plant. The calyx is about seven or eight inches in circumference and of singularly glowing colors—a mingled orange and scarlet of varying tints. A group of these plants grown in deep soil would give a rich and bold effect, and when cut the inflated envelope of the fruit lasts for a long time. A correspondent of *The Garden* says that some of these fairy-like balloons are still bright, although they have been cut more than a year.

Along some of the more public business streets of Philadelphia, on market day mornings especially, interesting little collections of woody herbs are offered for sale by colored folks from out of town. One such little sidewalk-stand last Saturday offered bunches of the spicy leaves of the Creeping Wintergreen, or Checkerberry, which lacked the gloss, but were almost as varied and brilliantly colored as Galax leaves. Calamus, slender Sassafras roots and the thicker Dandelion roots, with the bark of Wild Cherry, Sassafras and Prickly Ash,

all sold for some asserted medicinal value. Then there were fresh Catnip, clumps of the grassy young foliage and roots of Star of Bethlehem, leaves of Dandelion for salad, little nose-gays of Trailing Arbutus, and plants of the same well rooted in the glistening sand of The Pines of New Jersey, and patches of moss. There were plants of Peppermint, too, the straggling, nearly bare, stems showing little green and purple leaves on the ends.

We have alluded to the danger which threatens Niagara Falls since several great corporations, eager to secure power for nothing, are struggling for the privilege of taking water for their private use from what is now a public stream. Attention has also been called to the fact that surveys by the Government Engineer seem to show that the level of the Great Lakes has fallen within the past twenty years, and is still falling, and it is interesting to inquire, therefore, what will be the effect of the great Chicago drainage canal in the same direction. The Niagara is the outlet of the lakes, and any lowering of their level will, of course, be felt at the Falls. *The American Architect* doubts the propriety of draining a navigable lake for the purpose of floating the sewage of a city down upon the people of southern Illinois and the states below. But, besides this, the whole country has an interest in the Falls of Niagara, which will be affected, no one seems to know how much, by the Chicago canal.

According to a recent publication of the Department of Agriculture on Nut Culture in the United States there are about 250,000 Coconut Palms of all ages on the eastern coast of Florida, some 25,000 of which are bearing. On the shores of Lake Worth some 50,000 trees, old and young, are now growing, and nothing can be more picturesque or graceful than the soft, yellowish green leaves of these groves. Many of the leaves are as much as twenty feet long and as perfect throughout as an ostrich plume. Florida growers bury the nuts until they sprout, and then plant them in holes some two feet deep and twenty feet apart. The sprouted nuts are covered with good earth, and as the plant grows the earth is filled about it until it is level with the surface. The tree is fruitful near the salt water in Florida south of Lake Worth, on the east, and Charlotte harbor on the west, including the keys. It begins to fruit in from five to seven years from the planting of the nut, but when removed inland it is not fruitful and does not thrive. On Key West there are some trees over fifty years old.

In Bulletin No. 40 from the Oregon Experiment Station, we learn that for commercial purposes there are practically only seven varieties of Apples grown in that state. Of these the Spitzenberg is the most generally planted and the best liked, and this is followed in the order of their acreage and reputation by the Ben Davis, the Newtown Pippin, the Baldwin, the Red-cheeked Pippin and the Northern Spy. The first orchards which were planted as minor appendages to farms where the fruit was only grown for home use have been allowed to be preyed upon by various pests until they are nearly valueless, so that the orchard area has actually decreased in recent years. New orchards are now being planted on a considerable scale, and organized efforts have been undertaken to combat the insects, of which the San José scale, the green aphid and the woolly aphid are the most serious pests, and the latter can hardly be annihilated since it lives both at the root and the top of the trees. On the branches the woolly aphid can be controlled by caustic washes, and it is to be hoped that some variety of Apple will be found with roots that can resist its attacks.

It has long been a common opinion among farmers in this country and in Europe, that where seeds are produced in pairs one of these will germinate the first year after ripening, and the other will not germinate until the second year. Experiments with the seed on a spikelet of Wild Oats, *Avena fatua*, and the Sandbur, *Cenchrus tribuloides*, have shown that there was no foundation for this belief, but with the Cocklebur, *Xanthium Canadense*, it has been discovered that the germination of both seeds in a pair in one season is exceptional. Very interesting are the details of some studies by Professor J. C. Arthur as given in a paper read at Springfield, Massachusetts, at the last annual meeting of the Society for the Promotion of Agricultural Science. He proved that neither of the two seeds had the advantage over the other in any physical protection, but he discovered at last that there was a constitutional difference in the character of the protoplasm of the embryos, so that one seed has a short resting period and the other a very long one—that is, the seeds are distributed in time, one of them germinating a year, at least, later than the other, instead of being scattered in space.

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The Obliteration of Public Parks.

THE consolidation of three great libraries of this city has revived the project of erecting a monumental building to contain them in Bryant Park, where the reservoir now stands. Whether the reservoir ought to remain where it is or be taken down depends, of course, on its usefulness. It ought to stand as long as it is needed for the water-supply of the lower part of the city, and while it serves this purpose it will continue to be a dignified structure with a distinct æsthetic value. If, on the other hand, it is of no real use, it should be torn down, for, however well proportioned its lines, a mass of stone like this can have no real beauty unless it means something. If its removal is once determined, arguments for erecting the library on its foundations are something like these: It is the duty of the city to erect such a building somewhere; the location is central and accessible; the city will have to pay nothing for the land; no park space will be curtailed, because the library will occupy fewer square feet than the reservoir does, and Bryant Park, which adjoins it, will be enlarged rather than encroached upon.

On the other hand it is argued by a large and influential class of citizens, some of them trustees of the consolidated libraries, that if the city acquires a block of open ground it should by all means retain it for park purposes. Under a mandatory law the proper officers of the city have within a few weeks condemned two areas larger than that covered by the reservoir, one on each side of Broadway in thickly settled districts, and they will soon begin to tear down the buildings now occupying this land and convert it into parks. This has already been done at Mulberry Bend. Another block will be condemned within a year, and the city is authorized by law to spend a million dollars per annum for this purpose. It would seem, therefore, a singular inconsistency to continue the purchase of park land in the heart of the city every year and then to cover up park space which is already owned by the city.

At a recent public meeting in behalf of free libraries, Mr. Andrew Carnegie asserted that he would never advocate the surrender of a foot of park land for any other purpose than for a library of the particular kind which he favored. And this is precisely what makes these repeated attacks

upon public parks so dangerous. The reasons for each proposed infringement seem overwhelming to the promoters of this particular movement, and in general these are projects which in themselves are highly praiseworthy. Rapid transit was a crying need, and therefore the city gave a railroad corporation permission to invade the Battery and to make a blackened ruin of a large portion of that beautiful green. Now equally strenuous advocates are asking for the confiscation of a still greater portion of this park for a loop for the same railroad. When the city wished to give land for a great federal building a large portion of City Hall Park was sacrificed in the same way, another piece was covered over by the Tweed Court House, which also was called a public necessity, and now, "for this purpose only," some friends of this library wish to cover up another possible park. The trouble is that next year there will be other reasons quite as cogent for using some other park for some other purpose. Mr. Carnegie would be willing to give a park for a library, but for nothing else. There are other people who hold that the city owes a debt of gratitude to the Academy of Design which it can only liquidate by giving this institution a building place in one of the parks. In the name of charity another association may soon demand park room for a hospital, and even now some enterprising citizens are asking for a section of Central Park to be devoted to a permanent exhibition for the glory of the metropolis.

The only safe rule is to refuse absolutely to divert a single foot of park space from its legitimate use. If the city can afford to give any of its public land it can still better afford to give money. Why is it not wiser to give the library enough to buy the land it needs than it is to give away park space and then pay a million dollars for a park of the same size somewhere else? If the reservoir is torn down, this will be the only open space along Fifth Avenue from Twenty-third Street to Central Park, and every foot of the land is needed for a pleasure-ground. The policy of demolishing solid blocks of buildings to secure open spaces shows that the people have begun to realize that these are essential to their health and comfort. Having learned this, they should be educated to consider every encroachment upon the park space of the city as an invasion of their rights, which they should be prepared to resent as they would resent the destruction of any other public property.

WE have received a circular from the Royal Horticultural Society, London, in which special prizes are offered for dessert apples and pears. These are called the Veitch Prizes for Flavor, and they are offered at every fruit and flower meeting of the society for the coming year, with a first and second prize for the best-flavored apple and a first and second prize for the best-flavored pear. Six fruits of each variety must be shown, and the judges are at liberty to cut any three of them. The exhibitor must guarantee that the fruit exhibited has been grown entirely out-of-doors, and he must state on the name-card whether it was grown on a wall, bush or standard, together with the aspect of the tree and its geographical location, the nature of the soil in which it stands, and when he knows it, the stock on which the scion was grafted. The fruit is judged by points, twelve being the maximum, and these points are distributed in the following proportion: For flavor, six; for quality, three; for appearance, two, and for size, one. It is explained that "quality" is intended to mean the degree of smoothness or meltingness of the flesh (the absence of grit), or in the case of early apples, crispness and juiciness of the flesh may be considered. Quality, therefore, refers mainly to the texture of the flesh. Appearance, of course, includes color and beauty of form; but size, which counts only one-twelfth in the estimate, does not mean that the largest fruit receives the highest marking. There is a type size which invests the fruit with its greatest value for table use, and this is counted perfection. Enormous specimens are not preferred, since beyond a certain point size is a defect in dessert fruits.

We have seen oranges in Florida judged somewhat in this strict fashion, but certainly it is not common in American exhibitions to lay such a stress on flavor and quality as is indicated in this schedule. Every one will admit that in our exhibitions great size and showy appearance count for more than they deserve. For dessert fruit, a beautiful appearance is certainly an advantage; but, after all, quality, if we use the word to include flavor, ought to be the controlling element of its value. In our home market it is true that a beautiful apple or pear will find a readier sale than one which is less attractive in appearance, although it may be better in quality. We apprehend that this condition of affairs prevails to some extent in England, and yet these prizes would seem to indicate that English horticulturists lay more stress on quality than we do here. If it is true that the English market demands high quality and that it will demand it more urgently in the future, it is worth while to inquire how long it will be profitable to ship Ben Davis apples to Great Britain. This variety has keeping qualities and appearance, and the trees are very productive, but it is inferior in flavor to many other sorts, and it is well for those who are raising apples for export to consider whether more attention should not be given to the quality of the fruit. No doubt, the time is coming when quality will count for more at home than it has done, and the growers who select varieties for the good texture and high flavor of their fruit will probably make no mistake, even for the home market.

Thrinax in Florida.

IN 1875 Dr. A. W. Chapman found growing on the Florida keys one of the West Indian Thatch Palms, *Thrinax parviflora*, Swartz, a tree twenty or thirty feet high, as it grows in Florida, with a slender stem not more than five inches thick, orbicular leaves three or four feet in diameter, bright green above and pale below, and a short slender-branched spadix with coriaceous sheaths pubescent above the middle and often ciliate on the margins at the apex. The flowers open in the autumn and are raised on stout spreading pedicels; the perianth is obscurely six-lobed; the six or nine stamens are composed of slender filaments and introrse anthers, and the large funnel-formed stigma is oblique at the apex. The fruit, which ripens in the spring, is globose, black, a quarter of an inch in diameter, with thin dry flesh closely investing a membranaceous endocarp. The seed is tawny brown and marked by deep vertical furrows caused by the enfolding of the seed-coat into the ruminate albumen. The pedicellate flowers, the thin dark flesh of the fruit and the grooved seeds with ruminate albumen are typical of *Thrinax* as the genus was first described, and plants with these characters are now grouped together in a section, *Euthrinax*.

In 1879 Mr. A. H. Curtiss found on No Name and Boca Chica keys another *Thrinax* which has been referred to *Thrinax argentea*, Desfontaines, but it now turns out to belong to another section of the genus (*Porothrinax*), and appears to be undescribed. In *Porothrinax* the flowers are nearly sessile; the fruit is yellowish brown, with a crustaceous pericarp, and the seed is dark brown and lustrous, without grooves, much depressed at the base, and the uniform albumen is penetrated by a deep broad basal cavity. The size of the fruits suggests the name of *Thrinax microcarpa** for this species. It is a tree rarely

more than thirty feet in height, with a trunk eight or ten inches in diameter covered with smooth pale blue rind, flowering in the spring and ripening its fruit late in the autumn. The leaves are from two to three feet across and split to below the middle or near the base of the leaf almost to the rachis into divisions which are an inch wide at the middle of the leaf, and rather less than a quarter of an inch wide at its base. *Thrinax microcarpa* grows on dry coral soil on No Name Key, Bahia Hunda Key and the shores of Sugar Loaf Sound, Florida.

On the Marquesas keys and on some of the small keys east of Key West there is another *Euthrinax* whose flowers are still unknown. It is a low tree with a short thick trunk raised above the surface of the ground by a cluster of stout roots, large orbicular leaves with blades longer than the petioles, and fruit which differs from that of any of the described species of *Thrinax* by the thickness of the fleshy succulent pericarp. Portions of a leaf and a few fruits of another *Porothrinax*, to be distinguished by its much larger fruit, were collected by Dr. A. P. Garber at Cape Sable in October, 1879, and are preserved in the Gray Herbarium.

The flowers, fruits and leaves of these two trees, with information as to their distribution, size and uses, are specially desired. C. S. S.

The Tannin Value of Some North American Trees.

TANNIN is found in the bark of nearly all trees, yet little attention is paid to the economic possibilities of this constituent. When timber is cut for lumber the bark is usually wasted.

There appears to be no record indicating the amount of tannin in many of our native trees. No doubt, all of them have been tried at various times in the tanning industry, and the barks of a few of them are used at the present time. The following list of results recently obtained will indicate in a certain degree the value of a number of barks, but, as nearly all of them were collected during autumn or winter, the percentages of tannin given probably indicate the minimum amount contained therein:

Barks.	Locality.	Moisture.	Ash in absolutely dry bark.	Tannin in absolutely dry bark.
<i>Taxus Canadensis</i> . . .	Pennsylv'nia	10.80	5.64	20.46
" <i>baccata</i>	Bengal, India	14.38	6.19	22.83
<i>Libocedrus decurrens</i> .	Oregon.	6.17	2.24	7.14
<i>Thuya occidentalis</i> . .	Philadelphia.	5.61	6.46	6.13
" <i>gigantea</i>	"	6.93	6.10	8.16
<i>Cupressus thyoides</i> . .	New Jersey..	34.75	2.88	4.44
<i>Juniperus Virginiana</i> .	Philadelphia.	8.64	6.30	7.30
" <i>Californica</i>	California . .	5.57	9.43	8.10
" <i>occidentalis</i>	Oregon.	7.72	5.60	5.17
" <i>communis</i>	Philadelphia.	5.95	6.49	5.66
<i>Taxodium distichum</i> . .	Alabama . . .	6.61	3.88	4.28
<i>Sequoia sempervirens</i> .	California . .	7.99	0.64	1.63
" <i>gigantea</i>	"	6.45	0.37	2.77

Taxus baccata can hardly be considered a native tree, but the foregoing results are given for comparison, and they indicate a close relationship in the constituents of the two species, although growing in widely different parts of the globe. The amount of tannin found in these specimens indicates that the bark of *Taxus* would make an efficient tannin material.

Libocedrus, *Thuya occidentalis* and *gigantea* and all the *Junipers* contain sufficient tannin to make them valuable in the absence of richer material. *Taxodium* and *Cupressus* under some circumstances would also be valuable. The column headed "locality" in the foregoing chart indicates the place where these particular specimens were collected, and not in every case the place where the trees are native, for it was necessary to get a few of the samples from nursery stock near Philadelphia.

My thanks are due to Miss Alice Eastwood, of San Francisco,

rounded at the apex; ligula orbicular, thick, concave, lined with hoary tomentum; petioles slender, flexible, biconvex, unarmed; vagina elongated, light brown, the fibres slender. Spadix elongated, interfoliar, compound; primary branches short, slender, compressed, erect and spreading; secondary branches flower-bearing, slender, pendulous; spathes coriaceous, elongated, acute, deeply divided at the apex, tomentose above the middle; bracts acute, scarious, caducous.

No Name and Boca Chica keys, Florida, A. H. Curtiss, 1879.

* *Thrinax* (*Porothrinax*) *microcarpa*, Sargent, n. sp. Flowers solitary, bracteolate, articulate on broad disk-like pedicels; perianth cupular, white, six-lobed, the lobes broadly ovate, acute, half as long as the ovary; stamens six, inserted on the base of the perianth; filaments broad and flat, slightly united below, slender and terete above, exerted; anthers oblong, emarginate, attached on the back, versatile, red-veined and extrorse at maturity; ovary ovate, sessile, one-celled, orange-colored, gradually narrowed into a short stout style dilated into a broad funnel-shaped truncate stigma; ovule solitary, basilar, erect. Fruit plump, one-eighth of an inch in diameter, brownish brown, short-stalked, bearing at its base the enlarged persistent perianth of the flower, tipped with the remnants of the style; pericarp crustaceous, of two coats. Seed subglobose, depressed at the base; raphe obscure; hilum basal, pale, conspicuous; testa membranaceous, bright chestnut brown. Embryo apical in uniform albumen penetrated by a broad deep basal cavity. A slender tree; twenty to thirty feet; leaves terminal, orbicular, coriaceous, pale green above, silvery white below, more or less coated with hoary tomentum, especially on the lower surface, plicately multifid, the divisions induplicate, with thickened ribs and margins; rachis short, slightly convex, gradually narrowed and

California; Mr. A. E. Wild, Bengal, India; Mr. E. I. Applegate, Klamath Falls, Oregon, and Dr. Charles Mohr, Mobile, Alabama, for specimens kindly furnished by them.

College of Pharmacy, Philadelphia, Pa.

Henry Trimble.

Grape-fruit and Shaddocks.

DURING my recent visit to New York I was much interested to notice the considerable demand that existed there for grape-fruit,* from the West Indies. It appears to be very strongly recommended by the medical faculty for its refreshing and tonic properties, and, in con-



Fig. 23.—Pumelow or Shaddock, globular fruit. Diameter, 6 inches; weight, 49 ounces; flesh pink, with good flavor.

sequence, the use of it has become an important feature in the diet in American cities. The fruit I saw in New York called grape-fruit consisted of various sorts and qualities, and there is little doubt that much confusion exists as to what is really grape-fruit as distinct from the allied Citrus fruits passing under such names as Pumelow,† Shad-



Fig. 24.—Pumelow or Shaddock, pear-shaped fruit. Diameter, 5 inches; length, 6 inches; weight, 32 ounces; flesh pinkish, flavor fairly good.

dock, Forbidden-fruit, Paradise-fruit and others. The chief characteristics of all these fruits distinguishing them from

the different varieties of the Orange are associated with the size and color. They are all, or nearly all, larger than the largest orange, and they are uniformly of a pale yellow color. In texture the rind may be smooth or even polished. It is seldom rough, nearly always firm and not very thick.

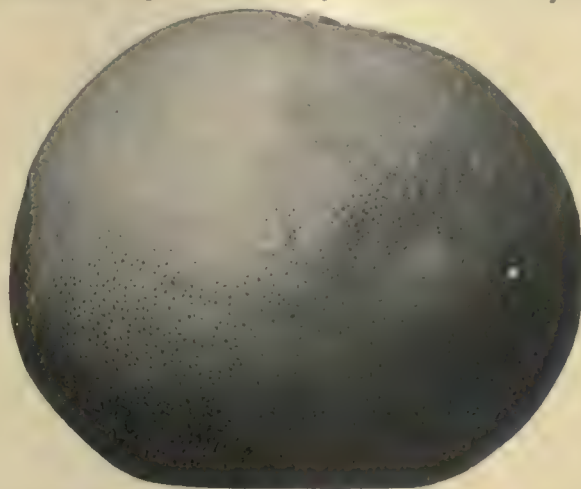


Fig. 25.—Grape-fruit, as sold in New York. Diameter, 5 inches; weight, 31 ounces; juicy, thin-skinned, excellent flavor.

The pulp is pale yellow or greenish white, sometimes pink or crimson; the vesicles of the pulp (juice bags) are more distinct than in the orange; very juicy, somewhat sweetish, with a distinct, but agreeable, bitter flavor. The pith surrounding the segments possesses more of the bitter than the pulp, but is less agreeable, and on that account is never eaten. In shape these fruits vary a good deal. Some are quite globular, others somewhat flattened at the top and tapering below, forming a pear-shaped body. Even in the globular fruits the top is more or less flattened. There are none, I believe, pointed at both ends.

Having indicated the general characters of this class of Citrus fruits I may venture on a brief sketch of their origin and history. It is agreed by all authorities that these fruits are quite distinct from the other groups of the Orange



Fig. 26.—Forbidden-fruit, as sold in New York. Diameter, 3½ inches; 4 inches long; flesh pale pink, skin thick.

family, such as the true Oranges and the Citrons. They have, therefore, been kept apart and ranged under the giant Citrus, *Citrus decumana*. In this species the tree is twelve to eighteen feet high, with a flat crown and spreading branches, usually with no spines. The leaves are elliptic-rounded at both ends, emarginate (that is, with a notch at the apex) and crenulate (having the edge marked with small depressions); the under side of the leaf is softly hairy, with the wings broad, crenulated as in the leaves and bordered with fine hairs. The flowers are in clusters of from three to nine, large, white and fragrant. The fruit is either globose or pear-shaped, forming many seedling varieties without distinct names. This is supposed to be a native of the islands of the Pacific, whence it had been brought

* It is so called because the fruits grow in clusters like a bunch of grapes.

† It is invariably spelled Pomelo in the United States.

to southern China, Japan and India. It was introduced to the West Indies, according to Macfadyen, from China by Captain Shaddock, whose name has since been given to it. The term Shaddock may be correctly applied to any of the larger members of the giant Citrus and is equivalent to the French pomelmouse, which is another form of the Dutch pomplemoes. The word Pomelow, so widely used in India and Ceylon, is supposed to be a contraction of "pomum melo," the melon apple. The largest Pamelows in India are said to reach "two feet in circumference and weigh ten to twenty pounds." The best sort, according to Bonavia, is "the thin-skinned red pumelow of the Bombay market." This is of a globose shape, juicy and "of the color of raw beef internally." There are, however, numerous grades in size, some being almost as small as oranges. In India the varieties do not appear to have recognized names. Elsewhere the smaller fruits have been variously called Paradise apples, Forbidden-fruit and Grape-fruit.

As regards the proper classification of the West Indian varieties, I cannot do better than record that put forth by Dr. James Macfadyen, the learned author of the *Flora of Jamaica*, which, however, he never lived to carry into more than one volume and part of another. Referring to the large-fruited sorts, he states: "There are two varieties of Shaddock. In var. A. maliformis the fruit is globose, with the pulp of a pale pink color, approaching to a very light yellow. In var. B. pyriformis the fruit is more or less pear-shaped, and the pulp is of crimson color, more or less intense. The second of these varieties is the more esteemed, being sweet and juicy, and having only in a slight and palatable degree the acidity which abounds in the first. I may remark that I have always found the pear-shaped variety good, whereas it is seldom the case with the round-shaped fruit. There cannot be a doubt but that if budding, as is done in China, were more generally practiced, instead of trusting to propagation by seed, that the fruit would be much improved."

The smaller Pamelows or Shaddocks are ranged by Macfadyen under a distinct species which he calls Citrus Paradisi. The tree is described as thirty feet high, of handsome appearance, with suberect branches and sharp at the apex. The leaves are oval, rounded and smooth on both sides. The flowers have linear petals and the stamens are twenty-five in number. The differences between this and C. decumana appear to consist in the more erect habit of the plant, in the rounded (not emarginate) leaves, and in the linear rounded (not oblong-obtuse) petals. With regard to the fruit he remarks: "There are also two varieties of this species: var. A. pyriformis, Barbadoes Grape-fruit; var. B. maliformis, Forbidden-fruit. The pear-shaped variety, as the Shaddock, possesses most of the sweet principle, and is, on the whole, a preferable fruit." This classification was made by Macfadyen nearly sixty years ago, therefore, long before these fruits were so widely distributed as now in other parts of tropical America. He was so accurate and skillful an observer that, as far as the New World fruits are concerned, we cannot very well improve upon it. It is doubtful whether the small-fruited sorts he places under C. Paradisi really deserves specific rank, but that point does not affect the main question with which we started, namely: What are the differences, if any, existing between the Shaddock and Grape-fruit? In summing up the results of the investigation we may say that all the larger-fruited sorts may be called indifferently either Pamelows or Shaddocks. These are merely the eastern and western names for the same thing, and are perfectly interchangeable. No distinction appears to have ever been made between them. There are two well-marked varieties, one being globose, with the flesh of a pale pink color, and the other pear-shaped, usually with a deep pink or crimson pulp. As regards the small-fruited sorts, these, according to Macfadyen, may be either globose, when they are called Forbidden-fruit, or pear-shaped, when Grape-fruit is the older name. The name Forbidden-fruit (from a fancied connection with the Garden of Eden)

is tolerably old in the West Indies. Tussac, in the *Flore des Antilles*, published in 1824, gives a good figure of the typical Shaddock, which he translates into the French *Chadec*. In vol. iii., pp. 73, 74, he states: "J'ai eu occasion d'observer a la Jamaïque, dans le jardin botanique d'East, une espèce de Chadec dont les fruits, qui n'excedent pas en grosseur une belle orange, sont disposés en grappes; les Anglais de la Jamaïque donnent à ce fruit le nom de 'Forbidden-fruit,' fruit defendu, ou smaller shaddock." Later on he refers to the same fruit in the following words: "C'est une assiette de dessert très distinguée et fort saine" (p. 74). In the illustrations here given are shown the various fruits as known in the New York market. The names attached to them do not, however, correspond to Macfadyen's classification. In the case of the Forbidden-fruit and grape-fruit they are exactly reversed. As usually happens when a name has become familiar in commerce, it is eventually applied in a much wider sense than the original one. Thus, the term grape-fruit has become so general that any moderately large fruit, provided the skin is pale yellow, thin and smooth, and the pulp of a delicate flavor, is designated by it. The fruit commonly called grape-fruit in New York is really the Forbidden-fruit of the West Indies. The true grape-fruit is pear-shaped, and, according to Macfadyen, when obtainable at its best, is preferable to the Forbidden-fruit. The fruit shipped from the Bahamas as grape-fruit is usually round, with a polished yellow skin of a silky texture and very heavy. This is probably one of the best of its class, and quite equal to Macfadyen's pear-shaped variety. Next comes some excellent fruit from Jamaica, no doubt that already referred to by Tussac under the name of Forbidden-fruit, a smaller shaddock. According to the New York estimation, this would be almost a typical grape-fruit, supplying "une assiette de dessert très distinguée et fort saine."

Kew.

D. Morris.

New or Little-known Plants.

Lavatera insularis.

FOUR species of *Lavatera* have been described from the islands situated off the western coast of North America. *L. assurgentiflora* was described by Dr. Kellogg from cultivated specimens raised from seed said to have come from the small rocky island lying south of Santa Barbara, known as Anacapa. This species is commonly cultivated in western California as an ornamental plant or as a wind-break. It grows very rapidly and thrives well, but must be protected from cattle and rabbits, which are very fond of it and would soon kill it. Californians of Spanish descent claim that the seed of this species was brought from Europe by the padres and raised by them about the old missions. There is a very similar form in the Mediterranean region, where many species of *Lavatera* grow. *L. assurgentiflora* has been found on San Miguel, Santa Rosa and small rocky islets about Santa Catalina Islands.

Another species is known only on Guadaloupe, an island far out in the ocean west of Lower California, and another is peculiar to San Benito, a group of islets nearer the Mexican mainland and north of Cedros Island.

Lavatera insularis (see figure on page 165) is supposed to be a native of the Coronados, small rocky islands belonging to Mexico, situated near the mainland in plain view of San Diego. The distribution of this species must be extremely limited, for, according to Mr. A. W. Anthony, the well-known ornithologist, to whom I am indebted for my information, it grows only in one cañon of the largest island. A great part of the year, from lack of water, it is in a dried-up condition, but cultivated plants well watered bear leaves and flowers throughout the entire year. Plants growing in my garden at San Diego, nearly two years old from seed, are quite attractive in appearance, and seem very different from any of the cultivated *Lavateras* of California.

The cultivated plant, already as large or larger than

those of the island, branches from the surface of the ground and grows into a perfectly hemispherical shape about four feet in diameter, and shows a disposition to increase in breadth rather than in height.

The flowers are yellowish white, striped and tipped with purple, and would not be conspicuous even if they were

Cultural Department.

The Water Garden.

THE Water Soldiers still lie quietly at the bottom of the tank, but the hardy *Nymphæas* have suddenly awakened and are unfolding their leaves, though yet their leaf-stalks have not



1. A flowering branch, natural size.

Fig. 27.—*Lavatera insularis*.—See page 164.

2. Vertical section of a flower, natural size.

not completely hidden by the leaves. Although full of flowers and fruit, they are completely concealed by the almost unbroken hemispherical covering of soft green leaves.

San Diego, Calif.

T. S. Brandegee.

lengthened. Some other hardy aquatic plants need even less encouragement, and *Aponogeton*, the beautiful and fragrant Cape Pond Weed, has already ventured to float a leaf at the surface. It is, perhaps, not well enough known that hardy *Nymphæas* are among the most reliably hardy plants, pro-

vided that they are established and have a covering of water, if only a few inches over their crowns.

A few of the species and varieties have been well tested here for several years, being completely frozen in ice each winter without injury. Last winter all the Pond Lilies were left exposed in the shallow water of the tanks and were frozen up for most of the season, and none were at all injured. It seems that the rhizomes of these plants having comparatively large air cells are not injured by the temperature of ice, and this being formed around them is a protection from excessively low temperature. We had, as usual, a temperature under zero several times during the winter.

As it is about time to prepare a water garden it may be well to again call the attention of flower fanciers to this most attractive, fascinating and still novel specialty of gardening. Of course, if one has a natural pond the growing of *Nymphæas* is too obvious a decoration and too simple an operation to talk about, but in a common every-day dry yard the water garden charms, if only with its unexpectedness, and the modest owner of a few feet of water surface need not envy a broad expanse where the muskrats would probably eat up his good tubers. My first water garden, composed of three *Nymphæas* in three sunken washtubs, backed and edged with subaquatic plants, was much prettier in effect than anything possessed since in more ambitious tanks which are more practical than æsthetic, and I should advise any one to whom expense was an object to commence the culture tentatively in the same way that I did. Of course, this is a very modest beginning, and the plants do not have much chance to expand, but it is sure to give satisfaction to any one really fond of seeing things grow. It is only with aquatics that one discovers the full effect of warmth and moisture on plant life. *Nymphæas* are, of course, the first choice for water gardens, and one should be careful not to introduce other plants, especially in large gardens, unless they are tender and will disappear in winter. Hardy aquatic plants have a wonderful capacity for growth and increase, and are very difficult to eradicate if once established. One finds many curious life habits among the water plants, as the Water Soldier, *Stratiotes aloides*, which will soon rise from the bottom, and, floating at the surface, flower and sink, again to form a colony of young plants spread around the parents in the familiar "hen and chickens" style. There is another plant, interesting to the botanist and biologist, *Spirogyra*, which is often sent out by the florist with the *Nymphæas*. This is a great pest in a pond, and new plants should be examined and all traces removed. This appears in dark green threads, which increase so quickly in warmth that it is difficult to eradicate from among other plants.

Elizabeth, N. J.

J. N. Gerard.

Cannas.

THE freedom with which Cannas can be grown makes them everybody's plants, and it is not uncommon to see them growing thriftily in the backyards of crowded portions of the city. They are effective in every stage of their growth, and a mass of them in bloom is always pleasing.

After a rest of a month our last season's plants were gradually started and kept rather dry until active growth commenced. They began to bloom again in March, and after resting for a couple of weeks during May, which can be brought about partly by withholding water, they will be planted out again and will bloom for the remainder of the season.

Since the production of the Crozy type of Canna this has been the standard by which others have been judged, and nothing better, at least in form, was looked for, although new colors have been expected. These we have had in abundance, but as the type has always been so well defined it has been easy to decide on the merits of a novelty, and no introducer of any standing would risk his reputation by sending out inferior varieties. Now we have a new type, said to be a hybrid between *Canna flaccida* and the Crozy strain, one of which, *Italia*, has already been figured and described in *GARDEN AND FOREST*, and another, *Austria*, has also been noticed as bearing still larger flowers of similar form, pure yellow, with the exception of scarlet pencilings on the centre petals.

The introductions for the year of the Crozy type show an advance principally in larger flowers of symmetrical contour, full, and turned out on all sides of the stem so as to show a vertical face. Collectively, therefore, when best developed, they form a pyramidal spike. In beauty of outline and in the regular arrangement of its flowers, F. R. Pierson, a magnificent crimson with a golden throat, is the best of its type, and it is not likely soon to be excelled. Flamingo approaches it, although the short side spikes give the whole cluster a slightly more rounded appearance. As an element of beauty a head made

up in this way is not so attractive as one bold spike. For bedding purposes it will be superior on account of the long time one flower-stem will remain in good bloom. Trilby claims favor as the Orchid Canna, and under glass it is exceedingly beautiful. It is bright yellow, with clearly-cut scarlet markings in the centre, and the large flowers have more substance than many of its color.

Pierson's Black Beauty is a seedling from President Carnot. This old variety is conceded by all who have grown it to be the best of all the bronzy-leaved varieties which have also attractive flowers. No doubt, J. D. Cabos and J. C. Vaughan, bronzy-leaved varieties, with handsome salmon-colored flowers, were both derived from this. Black Beauty eclipses them all in the color of its foliage and is equally effective in bloom.

Among yellow-banded Cannas of the Crozy group, Queen Charlotte, of last year, took a leading position. But the specialist has been at work in the mean time, and will introduce Little Billee as an improved seedling from Queen Charlotte. It is dwarfier and said to be superior for massing. Under glass it certainly is a most attractive variety, and, compared with Queen Charlotte, it is slightly deeper in tone. Madame Alphonse Bouvier is another so-called Orchid Canna of singular beauty. The ground-color is scarlet, with an irregular orange band continued into the throat. Souvenir Antonin Crozy remains the best of all the true Crozy type, and it is doubtful if any of this year's introductions will equal it in beauty. Ami Pezeux competes with F. R. Pierson among maroon shades. All through the flower are scattered dots of a deeper hue in the same way as the so-called yellow Cannas are speckled with red. Madame Rozain is a deeply toned Madame Crozy, with the addition to the characteristic yellow band of a yellow throat, which rather increases its effectiveness. Côte d'Or is described as strikingly effective for bedding, with saffron-colored flowers. It is compact and dwarf.

Among older varieties, Alphonse Bouvier stands at the head. It is not of the ideal form; the terminal spike perversely droops. While flowers continue to expand on this, others take its place later, also spreading out. They continue to open in large effective clusters for a long time. Its lustrous maroon-colored flowers are unsurpassed by any variety known. Another of exactly the same type is Helen Gould, and this is bright amber. It was one of the most striking varieties in a large group here last summer. Although introduced several years ago, Paul Bruant is as yet little known. It is one of the best of crimson-flowering Cannas for pot-culture. On a plant in a ten-inch pot are three well-developed flower-stems carrying good heads of bloom, which would make this an effective decorative plant in any grouping. Florence Vaughan has been a surprise this season as a pot-plant, being the earliest to bloom and the most floriferous of any of the so-called yellow-flowered varieties.

Wellesley, Mass.

T. D. Hatfield.

Greenhouse Climbers.

VISITING not long ago the greenhouses of the Massachusetts Agricultural College, at Amherst, I was much impressed with the luxuriant display which was made there by well-grown specimens of common climbing plants. They were in every case planted out in the borders, which is, no doubt, the best way of treating climbers, which are, in most cases, impatient of having their roots restricted. There are two large octagonal houses, in addition to a number of others. In one of these *Asparagus plumosus* is trained up the pillars which support the roof, and is festooned from pillar to pillar with particularly graceful effect. In the other octagonal house a fine plant of *Plumbago Capensis* occupied one pillar and was covered with its beautiful blue flowers. A handsome Cherokee Rose, a plant often commended and described in *GARDEN AND FOREST*, occupied a considerable portion of this house. Growing with it as a companion plant was a very fine specimen of the climbing *Perle des Jardins*, which was carrying great numbers of its lovely yellow flowers. Another pillar was occupied by that excellent climber, *Jasminum revolutum*, with its compound corymbs of bright yellow flowers and dark green pinnate leaves. This is one of the few vines which insect pests do not take to readily. In another house was a large plant of *Passiflora princeps*, with pendulous racemes of red flowers. *P. quadrangularis*, var. *acubifolia*, was also growing in the same house, and, in my opinion, this is the best of all the Passion flowers. The stem, as its name indicates, is four-angled; the alternate leaves are cordate, six to eight inches long and four to five inches wide and mottled with yellow, resembling the *Acuba* leaves very closely. The flowers are white outside, and of a dull reddish color within, and very

odoriferous. A good plant of *Aristolochia Sipho* was also showing its usefulness as a greenhouse climber as well as being a hardy one. *Cobaea scandens* occupied the end of another house and was bearing hundreds of its purple, cup-shaped flowers.

In a house devoted to Cacti and other succulents, was a large specimen of *Pereskia aculeata*, the Barbadoes Gooseberry, which covered a space of about ten feet by fifteen. *Pereskias* belong to the Cactus family, but this species is so unlike any of the other members, that, except for the flowers, which are of a creamy white color, one would almost fail to see the connection. It produces true leaves in abundance of a bright green color, and the stem is round and woody.

A good specimen of the noble *Cereus triangularis* was also doing well in this house. These greenhouses have been built several years, and the climbers have become so well established that they are now displaying the best effect which can be produced by intelligent cultivation, persisted in for a series of years.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Ouvirandra fenestralis.

THIS plant has been too long regarded as an aquatic freak difficult to grow and apt to die without any apparent reason. This is not true. Like many other plants, when their peculiarities are understood, the cultivation is simple, and this singular and interesting plant ought to be found in every collection of stove plants, and, of course, no aquatic house is complete without it. It grows in Madagascar on the borders of streams, the leaves being merely a network of vascular tissue resembling lace, or, as its specific name implies, a lattice window. In well-grown plants they are from twelve to eighteen inches long and about one-third as broad, oblong, with an obtuse apex, and spreading out almost horizontally beneath the surface of the water. When young they are light green, but they change to a deeper color as they mature, when the midrib is a bright yellowish green. The plant grows freely at a temperature of from seventy to seventy-five degrees, Fahrenheit, or from a little lower in longer days. During a cold spell, when the temperature is likely to fall below the minimum, warm water can always be added, and the top of the tank covered with shading material, or even paper, to retain the heat. Little shading is needed during the winter, although some may be needed after the first of March. There is no necessity of covering the water with such plants as *Azolla* or *Salvinia*, because they grow densely and would hide the plant, even if too much shade, with high temperature, did not weaken its growth, so that the leaves would become drawn, narrow and soft.

The *Ouvirandra* is not particular as to soil. I have grown it with success in different composts, and it surely will thrive in any mixture consisting of fibrous loam, rotted manure and sand. My preference is to have the soil rather heavy; in fact, the greatest success I have achieved has been with soil like that used for *Nymphæas*—that is, turfy loam, well-decayed manure and a little sharp sand. Any wooden tub or kerosene barrel cut in two makes a good receptacle, only, of course, this latter should be burned out before it is used. Glass aquariums are well adapted to the cultivation of these plants, and they afford the best opportunity for inspecting them. When the tubs or other receptacles are clean there is no need of changing the water when any scum arises or dust settles upon it. Pure water can be added with a hose to flush the tub, and the plants themselves will keep the water clean as they are good furnishers of oxygen. They do not suffer from insects, and they are no more difficult to grow than the well-known *Apongeton distachyon*, with which genus *Ouvirandra* is now included.

Riverton, N. J.

William Tricker.

Cyanide of Potassium as an Insecticide in Glass Houses.

AN interesting series of experiments has lately been carried out at the Department of Agriculture, under the direction of Professor Galloway, Chief of the Division of Vegetable Pathology, in the way of checking the ravages of the black-spotted mealy bug, *Orthozia insignis*. This pest is a native of South America; it was first noticed, I believe, in some greenhouses in the state of New York about five years ago. Since that time it has spread in all directions, and is getting to be quite as troublesome on certain plants as the mealy bug and green fly are on others. It was described at length in a bulletin issued last year by the Hatch Experimental Station. Some time ago Professor Galloway was impressed

with the idea that the method in use in Florida and elsewhere, whereby the Orange-trees are fumigated under tents with this cyanide, could, with certain modifications, be utilized in checking the devastations of the *Orthozia*, and the results, as seen in an exhibition at the propagating-gardens last week, have proved highly satisfactory. A house containing 15,580 cubic feet of space, which is used at present for storing *Coleus* for bedding purposes, was selected for the work. The *Coleus* is one of the favorite plants of the pest, although it is frequently found on a number of others, among which are the *Chrysanthemum*, *Lantana* and *Alternanthera*. The plants in the house selected were infested to such an extent that they were considered almost unfit for use this summer. The fumigation of the house took place after seven o'clock in the evening, as the presence of light nullifies to a certain extent the influence of the liberated gas. The ingredients used were three pints of water, the same quantity of sulphuric acid and five and a half pounds of cyanide of potassium; this was divided into three equal parts and placed in three two-gallon jars placed at equal distances along one of the side benches and close to the ventilators; the water was first poured in the jars, then the sulphuric acid, and through the open ventilator from the outside the cyanide was added. In less than two minutes the gas had evidently reached to all parts of the house. Twenty minutes later the ventilators, both top and bottom, were raised from the outside, provision having previously been made for this, as the presence of the gas after that period among the plants is considered hurtful to them. After careful inspection that evening and next morning not a live *Orthozia* was to be found, and after strong sunshine not a leaf appeared injured; even tender fronds of *Adiantum cuneatum* were uninjured. The common mealy bug and one or two species of scale insects were also killed.

Botanic Garden, Washington, D. C.

G. W. O.

Kämpferia rotunda.—Although a very old and well-known plant, this is usually grown for its foliage, but its exceedingly beautiful flowers are really its greatest charm. The flowers are borne in spring or summer before the leaves, which should be allowed to die down late in fall, and the plants may be kept in a dry state until January or February, when they should be placed in moss in flat pans with the roots but slightly covered. Or they may be planted and grown from year to year in an ordinary light compost and allowed to rest in winter. When brought into a brisk heat the leaves and flowers soon begin to grow. The flowers, not unlike Meadow Saffrons in form and color, are almost sessile, and produced directly from the root in great profusion. They are sweetly fragrant and of a bright rosy red color, or sometimes paler, each one lasting only a day, but succeeded by new ones for a long period. *Kämpferias* look best in masses when a number of flowers show at the same time. The leaves when fully developed are about two feet long, erect, broadly lanceolate and narrowed to a broad petiole at the base. The color is a dull olive-green, with one or two brownish longitudinal bands, so that the plant is quite effective even when out of flower.

Eranthis hyemalis.—There is, perhaps, no brighter and harder spring flower than the little Winter Aconite, which flowers here much later than in Europe. It is a very dwarf perennial with fleshy tuberous roots which produce a couple of petalately divided leaves each and a solitary flower of a bright yellow color early in spring. *Eranthis* is nearly related to the *Hellebores*. The flower is about an inch across, with six petal-like sepals and inconspicuous petals and nice little bunches of yellow stamens in the centre. The flowering stem is simple, and has three deeply lobed involucre leaves. It is much used in Europe in rough places among trees and shrubs, especially on sunny southern slopes; unfortunately, it is not always easy to naturalize in such places here. When growing and flowering in masses in early spring the effect is very rich and beautiful. It will grow in any moderately rich garden soil, but prefers one that is light, loamy and well drained.

Adonis vernalis.—This is one of the early spring flowers that ought to brighten every garden, whether large or small, at this time of the year. It is, however, hardly known, and the country homes which should now be gay with flowers have hardly a bud to show that spring has come. *Adonis vernalis* is not unlike a large *Anemone* in shape, but the color is a very bright yellow. The flowers are set off by light feathery foliage. The species grows to a height of eight or ten inches and forms masses of foliage and flowers as early as the latter part of March in favored localities. It is a very desirable plant for naturalizing in bare places in shrubberies and among rocks. As it is perfectly hardy, it will generally look out for itself,

once established. It thrives best in a rather moist position where it is partially sheltered from the sun, but will not grow well in too deep shade. It is easily propagated by means of seeds or divisions and requires no special culture.

Newark, N. J.

N. J. R.

Correspondence.

Buckleya Again.

To the Editor of GARDEN AND FOREST:

Sir,—Three years ago, in May, I visited Wolf Creek, a small hamlet consisting of some half-dozen scattered houses, about five miles below Paint Rock, the original locality of *Buckleya distichophylla*. The post-office is situated at the mouth of a stream of the same name that rises in the high mountains near the North Carolina line, and, after winding among the hills for some seven miles, empties into the French Broad. Here *Buckleya* was found at several points along the river, from about two miles above to a half-mile below the creek. In only one spot was it found away from the river-bank, and there not more than an eighth of a mile distant. In the locality in question some two or three dozen plants grew on the steep wooded bank of a small pond—half water, half quicksand—among Cherry Birches, two or three Oaks and the Big Laurel, *Rhododendron maximum*. The presence here of Hemlocks, *Tsuga Canadensis*, makes it probable that at some not very distant time this colony was also growing on the river-bank, for Hemlocks are almost entirely confined to the banks of the larger watercourses in the Alleghanies. The probability is increased by the fact that only a stretch of low bottom-land intervenes between the pond and the river.

About two miles above Wolf Creek the largest number of individuals found in any one place were discovered on an abrupt rocky bluff overhanging the river. In this sheltered spot there were probably 120 specimens growing under the shade of various large trees, along with Yellow-wood, *Cladrastis lutea*, and the Sweet shrub, *Buettneria fertilis* (*Calycanthus laevigatus*). Between these two stations the plants were scattered along the river—a half-dozen or so here and there—near the water's edge, usually growing with the Sweet-shrub, *Leucothoe recurva*, Hemlocks and Red Birches. All the specimens found were on the left bank of the river; none were discovered on the right bank. *Buckleya* is said to have been found on a bluff on Wolf Creek, about half a mile from its mouth, but I did not come across it there.

The largest specimens grew on the bluff two miles up the river, where they attained a height of ten or eleven feet, but the average shrubs are only six or eight feet high, with a stem diameter of about one inch at base. In habit *Buckleya* is more like a small tree than a shrub. It prefers a rich shaded soil, but sometimes grows in almost pure sand. It is a handsome plant in every part. The foliage is light and graceful. The female flowers, drooping at the ends of short twigs, with their crown of four sepal-like bracts, are much more conspicuous than the small staminate blossoms. The bark, reddish brown in color, with conspicuous lenticels, somewhat resembles that of the Cherry Birch. The wood is white and has a beautiful fine grain. A quantity of the nuts, or rather drupes, were sent to me during the following autumn by Master Harry Allen, who wrote that they are produced in great abundance. The largest ones are nearly an inch long. When dry they are light brown in color and deeply furrowed lengthwise. Although rich in oil, they are not unpleasant to the taste, being quite sweet and with a flavor somewhat like that of filberts. The shrub is well known at Wolf Creek, but has received no more distinctive local name than that of "the bush with queer nuts."

There seems to be no great danger of its immediate extinction. Its occurrence in several different places is one security against this. Then it is usually confined to places rather difficult of access and unfavorable for agricultural purposes. In spite of the apparent disadvantage of a separation of the sexes in so rare a plant, it matures a great quantity of fruit. In May I found numerous vigorous seedlings among the older plants, especially in the two larger colonies. Moreover, it is highly probable that further search along the banks of the French Broad, between Paint Rock and Wolf Creek and below Wolf Creek, may discover other stations. As far down the river as Newport the conditions are very similar to those about Wolf Creek, so that its absence, rather than its presence, there would be surprising. At any rate, it is pleasant to know that this rare and handsome shrub is not quite as near extinction as has been supposed.

Department of Agriculture, Washington, D. C.

T. H. Kearney, Jr.

Calochortus in Southern California.

To the Editor of GARDEN AND FOREST:

Sir,—*Calochortus Weedii* is found in great abundance about the foot-hills of Pasadena, but the plant does not flourish equally well in all places. The finest flowers I have found are on the north-eastern slope of the highest hill near the summit, where another hill to the north cuts off the cold mountain winds. The plants appear in early March among the Sagebrush, where the soil is red and loose, and it may interest your readers to know that the very sturdiest of them come out of the gopher-holes, where the bulbs are at least eighteen inches deep. In some former year a seed chanced to fall into one of these holes, and the dust sifting over it neatly buried it, where, perhaps, it found more moisture than its neighbors nearer the surface. At all events, the plants in gopher-holes grow with unusual vigor and their flowers are exceptionally large and brilliant. The terminal flowers are largest, and they are seen scantily in the early part of April, while the lateral buds follow until the middle and the upper part of the slopes are luxuriantly covered with the white flowers. I have often gathered twenty of them in the space of three square feet, the tallest being on stems three feet long. The seed-cups open by July, when the ground is literally alive with snakes. Few of the seeds reach the ground, however, as the small birds relish them and often pick into the three-cornered capsule before it is ready to open. *C. Weedii*, with pink flowers, is found on the bench-lands of the Cañon La Cañada, where it may be the color is modified by unusual exposure.

The mauve-colored flowers of *Calochortus purpurascens* are found in a few places on the bench-lands which look over Arroyo Seco. These are very large, and the yellow pubescence extends from the centre of the flower fully half the length of the petals, making a most beautiful combination of color. These flower later than the ordinary white ones. They are not as tall and less branched. *C. claratus* bears a beautiful canary-colored flower, and is found on the high hills overlooking the Cahuenga Pass.

Los Angeles, Calif.

Jennie Kruckeberg.

Recent Publications.

The Evolution of Horticulture in New England. By Daniel Denison Slade. Putnam's Sons, New York and London. 1895.

Dr. Slade's lifelong services to the art of horticulture are gratefully acknowledged by all lovers of the art in this country; and this little book, published just before his death, will be welcomed as a memorial of its author no less than for its own sake. It is somewhat overweighted by its title, for it is an attractive sketch rather than a scientific history of the progress of horticulture in New England since the time when the first colonists landed; but its delightful typographical dress and its simple pretty binding are entirely in accord with its character.

The volume begins with a brief sketch of the history of horticulture in the mother country, and then takes up the main subject from the very outset. It is impressed upon the reader that, in the early seventeenth century, New England was a forest-clad country, as regards its islands no less than its mainland, "the only exceptions to this condition being the salt marshes, the bogs and the higher ranges of mountains." An old chronicler relates that "the salvages are accustomed to set fire to the country in all places where they come and to burn it twice a year—that is, at the spring, and the fall of the leaf. The reason that moves them to do so is because it would otherwise be so overgrown with underweeds that it would be all a coppice wood, and the people would not be able in any wise to pass through the country out of a beaten path. This custom of firing the country is the means to make it passable, and by that means the trees grow here and there, as in our parks, and makes the country very beautiful and commodious." Nevertheless, much of the work of the early settlers was in clearing away the forests which obstructed agriculture and horticulture—how much it is hard for those who know eastern New England now to imagine until they have read many such notices as that which speaks of "a necke of land called Nahant" as being "well wooded with Oakes, Pines and Cedars." Their first

efforts in planting are carefully followed from year to year and from place to place by Dr. Slade, and the quotations from old writers, which show what plants they brought with them from the old country, are not more interesting than those which reveal their estimate of those which they found indigenous in the new. Their optimistic descriptions of the native fruits and berries certainly reveal that determination to look on the bright side of painful new conditions and to make the most of comparatively unattractive novelties which must always mark the successful colonist. Of course, Old World names are so often applied to different New World things that the task of interpretation is not always easy. For example, Wood, writing in 1629, says: "The Hornebound tree is a tough kind of wood, that requires so much paines in riving as is almost incredible, being the best for to make bolles and dishes, not being subject to crack or leak." The tree in question which, Wood explains, grows "with broad speard armes," was probably the Tupelo, the wood of which was used by the Indians for the purposes he notes, and which, along the Massachusetts shore, is still popularly called the Hornbeam. Growing wild, says the same writer, were "Strawberries in abundance, very large ones, some being two inches about: one may gather halfe a bushell in a forenoone. In other seasons there be Gooseberries, Bilberries, Resberries, Treackleberries, Hurtleberries, Currants, which being dried in the Sunne are little inferior to those that our Grocers sell in England. This land likewise affords Hempe and Flax, some naturally and some planted by the Indians, with Rapes if they bee well managed." The local Walnut-tree, says Wood again, "is something different from the English Wallnut. . . . These trees bear a very good nut, something smaller but nothing inferior in sweetnesse and goodnesse to the English Nut, having no bitter pill. There is likewise a tree in some parts of the Countrey that beares a nut as bigge as a small peare"—the Butternut. And, he continues, "the White Thorne affords hawes as bigge as an English Cherrie which is esteemed above a Cherrie for his goodnesse and pleasantnesse to the taste." But of the native New England Cherries even Wood could not speak in praise. "The Cherrie trees yeeld great store of Cherries, which grow in clusters like grapes; they be much smaller than our English Cherrie, nothing neare so good if they be not very ripe: they so furre the mouth that the tongue will cleave to the rooffe, and the throate wax horse with swallowing those red Bullies, as I may call them, being little better to the taste. English ordering may bring them to be an English Cherrie, but yet they are as wilde as the Indians. But the Plummes of the Countrey be better for Plummes than the Cherries be for Cherries; they be blacke and yellow, about the bignes of a Damson, of a reasonable good taste."

But, despite their readiness to be pleased with their new possessions, the settlers were lavish importers of products familiar at home. For example, among the articles ordered to be sent to New England by the Massachusetts Company in 1629, were "Vine-planters, wheat, rye, barley, oats, a hogshhead of each in the ear; beans, pease, stones of all sorts of fruits, as peaches, plums, filberts, cherries; pear, apple, quince kernels; pomegranates, woad seed, saffron heads, liquorice seed, madder roots, potatoes, hop-roots, hemp seed, flaxseed, currant plants and madder seeds." It is interesting to trace as far back as this the importation of the Woad-waxen which now so beautifully covers parts of Essex County; but Pomegranates certainly have not acclimatized themselves so well in New England.

More or less extensive orchards were early established. The first is believed to have been that of William Blackstone, to whom, in 1633, were granted "fifty acres . . . near his house in Boston, to enjoy forever." In 1765 this orchard was spoken of as still producing fruit, and its existence at even later dates is recorded. Blackstone himself afterward removed to Rehoboth and planted the first orchard within what are now the borders of Rhode Island.

Wood, writing between 1629 and 1633, mentions many

fruitful gardens in the regions about Boston, where, in his time, Boston itself was not the largest town. "The greatest Towne in New England," he says, was Dorchester, and a mile away lay "Roxberry, which is a faire and handsome Country-towne, the inhabitants of it being all very rich." And Boston is described as being "two miles North-east nor from Roxberry," and "although it be neither the greatest nor the richest, yet it is the most noted and frequented, being the Center of the Plantations where the monthly courts are kept. Here likewise dwells the Governour: This place hath very good land, affording rich Corne-fields and fruitful gardens." Brookline is noticed as a place called Muddy River, two miles from Boston, where the inhabitants of that place "for their enlargement have taken to themselves Farm-houses; where is good ground, large timber, and store of Marsh-land and Medow"—a description which is not out-of-date to-day.

In 1632, Conant's Island, in Boston harbor, was granted to Governor Winthrop, and was thereafter called "The Governour's Garden." Josselyn, writing in 1639, reported that he had received from there "half a score very fair Pippins . . . there being not one Apple tree nor Pear planted yet in no part of the Countrey but upon that Island."

But it was not long before the town of Boston was filled with such trees, and Mylne Street (now Summer Street) was especially a street of gardens. The one owned by Gamaliel Wayte was planted in 1692, and long remained famous; and in the eighteenth century this and neighboring towns were well entitled to boast of their horticultural products. Paul Dudley, writing of Roxbury in 1726, said, "Our apples are without doubt as good as those of England and much fairer to look upon, and so are the pears, but we have not got all the sorts. Our peaches do rather excell those of England, and then we have not the trouble or expense of walls for them; for our pear trees are all standards, and I have had in my own garden seven or eight hundred fine peaches of the Rareripes growing at a time on one tree. Our people of late years have run so much upon orchards that in a village near Boston, consisting of about forty families, they made near three thousand barrels of Cyder. This was in the year 1721. And in another town of two hundred families, I am credibly informed, they made near ten thousand barrels."

Many of the fine ornamental gardens laid out in Boston in the eighteenth century were preserved until comparatively recent days—for example, the one attached to the Faneuil mansion, nearly opposite King's Chapel, with which, Dr. Slade relates, he himself was intimately acquainted.

But it is impossible to follow his account of the progress of New England horticulture down to the present day; nor is his book of the sort which lends itself well to the reviewer's ordinary process of condensation and exposition. We have preferred not to attempt this, but, instead, to quote a few paragraphs from its earlier pages, which may suggest to our readers the interest of all the others.

As he reaches more recent times, Dr. Slade speaks of the great good done by the Massachusetts Horticultural Society, founded in 1829, and notices many of the charming suburban country places for which the environs of Boston have long been famous—places which, alas, must for the greater part soon perish before the steady advance of the city's streets. Nor does the volume lack some pages devoted to the consideration of gardening as a fine art—as an art of arranging surfaces of ground so that they may please the artistic sense—which are instructive as well as agreeable reading.

Notes.

One of the prettiest early yellow flowers is that of *Iris orchoides*, which was introduced into cultivation by Dr. Regel from the mountains of Turkestan. It is perfectly hardy and flowers with the early *Daffodils*. These flowers are not very large, but they are a pure rich yellow, with small blotches of olive or purple on the fall. The leaves at the time of flow-

ering are hardly six inches long, but the flower-stems are a foot or more in length, and each one bears in succession three to six flowers. The bulbs increase rapidly, and a colony of the plants at this season is one of the most interesting features of the herbaceous garden.

A circular has been sent out by the Division of Forestry of the Department of Agriculture which calls attention to the recent forms of legislation against forest fires and summarizes the existing acts now in force in the different states. The most complete law is said to be that of Minnesota, which is quoted entire, while the provisions of the Maine law are given with some detail.

It has been often argued that when orchards are sprayed with arsenical poisons while the trees are in blossom a great many bees are killed. The bees are not only useful as honey gatherers, but they are very helpful in fertilizing the flowers. Some experiments made last year at the Ohio Station show conclusively that bees may be killed in large numbers by spraying while the flowers are open, and since this practice is never necessary at that time for the destruction of injurious insects it should be avoided. The trees should be sprayed just before flowering and as soon as the blossoms have fallen, but never while they are in bloom.

The American Architect and Building News speaks appreciatively of the timber tests made by the Forestry Division of the Department of Agriculture, and adds very justly that when engineers, architects and builders are expending hundreds of millions of dollars every year for timber, that the collection of accurate information as to the qualities of our different woods is a matter second only in importance to the preservation of the forests. It is to be hoped that Congress will not be so short-sighted as to adjourn without making an appropriation for continuing the tests which have been going on now for several years. Of course, the value of such work depends largely on the number of experiments made. Only when tests are made in large numbers and under many conditions can we have confidence in the trustworthiness of the accumulated data in regard to the range of strength and other qualities of a given species.

The unusually hot weather during the second week in April, when the thermometer rose to ninety degrees, Fahrenheit, has hurried all spring-flowering shrubs into bloom. Before the hot weather began—that is, up to the 10th of April—no shrubs were in bloom in this vicinity, except occasionally a *Daphne Mezereum*, and Mr. Joseph Meehan wrote that *Prunus Davidiana* was flowering in company with the *Daphne* in Philadelphia. Last week, however, *Magnolia stellata* had burst into bloom, and is now much past its prime, and *M. conspicua* and *M. Soulangeana* were hardly a day behind it. The *Forsythias* and our native *Spice Wood* opened about the same time, and with them *Cornus mas* and the early bush *Honeysuckles*. Before this paper is read the *Peach-trees* will be in full bloom as the result of a week of August weather in the middle of April. It will be unusually good fortune if we are not visited by a severe freeze before another paper is published.

Mr. J. H. Hale, President of the Hale Georgia Orchard Company, says, in the current number of the *Fruit Trade Journal*, that from personal examination of the Peach orchards in that state he finds the prospects better even than last year, when Georgia had the best peach crop on record. The frosts that occurred during blooming time this year thinned out the prospective crop considerably, but it is difficult to find anywhere a single tree that is not now carrying a fair crop of fruit, while there are many trees so overloaded that if two-thirds of the fruit would drop off there would be more than enough left for a full crop. In the orchards in which Mr. Hale is directly interested, comprising 100,000 trees, *Elberta* is stated to be the only variety that is not greatly overloaded. The total crop of the state is estimated at fifty per cent. larger than that of last year, allowing for the first crop of several hundred thousand young trees in the Fort Valley section. The season is fully ten days in advance of last year. Mr. Hale concludes that good Georgia peaches of the *Alexander* type should be plentiful in northern markets by the 15th of June. New York fruit merchants are anticipating the first Florida peaches before the close of April.

Asparagus is now coming from as far north as Charleston and Norfolk, and the New Jersey crop is looked for any day. Fifty to seventy-five cents a bunch is the price at this time. Beans from Charleston cost twenty-five to thirty cents a quart, and peas from the same section seventy-five cents

a half-peck. New white turnips, from Virginia, may be had for ten cents a bunch. Well-grown white squashes from Florida cost ten to fifteen cents each, and southern tomatoes twenty-five cents a pound, the northern hot-house product bringing forty cents. Hot-house cauliflowers cost thirty-five to fifty cents each, lettuce ten to fifteen cents a head, and cucumbers twenty cents each—those from New Orleans filling out the needed supply at slightly lower prices. Mushrooms sell for ninety cents a pound.

Bulletin No. 59 of the Indiana Experiment Station treats of the bacteriosis of Carnations, an almost ever-present disease of these plants. It is easily detected, now that the cause is known and has been studied, but for years the leaves of the plants turned yellow and dried up before the cultivator's eyes, and not until half a dozen years ago was the true cause of the trouble known. Investigation has shown very plainly the presence of a true parasitic bacterium in the leaves of the *Carnation*; the germ has been separated and cultivated, and other plants have been artificially infected with it, so that there is no question as to the correctness of the diagnosis. This bulletin, which has been prepared by Professors J. C. Arthur and H. L. Bolley, gives a full history of the germ, which is called *Bacterium Dianthi*, and explains how it enters the plant and how it acts to destroy its host. It seems that no variety of *Carnation* is entirely exempt from the disease, but weakly varieties like *Buttercup*, *Sunrise* and *La Purité* are most affected. Poorly grown plants more readily succumb than those well grown, and partly starved or stunted plants are especially liable to attack. As it is necessary that there should be sufficient moisture on the leaves to enable the bacteria to move about and enter the pores, and thus gain access to the interior of the leaf, it is plain that keeping the foliage dry will prevent the disease. The trouble is that in this case the red spider might be as fatal as the bacteria. Dry foliage is in a direct line with the requirements of the plant, which is by its structure adapted to a dry atmosphere; its thick, smooth leaves and firm epidermis, and the waxy bloom of its surface, are all devices for conserving moisture. The true treatment, therefore, is to water the ground between the rows of *Carnations* with a stream of water, beneath a wire netting which is so arranged as to lift up the foliage. Spraying overhead should be practiced only occasionally, and on bright days, when the water will dry off quickly, and the water should contain a small amount of ammoniacal copper carbonate, as the germs cannot live in even a very weak solution of this compound.

The sudden change twelve days ago from persistent cold and rainy weather to midsummer temperature has affected the fruit market here in many respects: Oranges, for example, during last week declined fifty to seventy-five cents a box. Some 1,100 barrels of Jamaica oranges, variously known in the trade as *Late Bloom* and *New Crop*, are a part of the regular offerings. The quality of this crop, which appeared early this season, is unusually fine. Besides the usual receipts of Mediterranean oranges, California Navels continue plentiful. Exceptionally large specimens of the latter, sixty-four to the box, desirable mainly for decoration, sell at \$3.00 a box wholesale, while those of average size, 112 fruits to the box, and the yet more desirable size, 126 to the box, command \$3.50 to \$4.00. The hot weather caused an advance of fifty cents a box in the prices of lemons. Grape-fruit is still seen in the collections of retail dealers, but the extremely high prices of the past few months are not maintained by these belated specimens. Two cargoes of new-crop pineapples, altogether 2,500 fruits, reached this port from Cuba during last week, and somewhat larger invoices are expected during this week, the quantity in the corresponding periods of last year having been two or three times as great. The price now ranges from ten to twenty-five cents each, at wholesale, whereas a year ago the same grade brought six to eighteen cents. The first California cherries of the season reached here on April 16th from Vacaville. The variety, *Early Purple Guigne*, was of fair size, but lacked the deep rich color of fully ripe fruit. They sold at retail for \$1.25 a pound. Although strawberries continue to come from Florida, and the first shipments from North Carolina are already in our markets, prices are higher than they were several weeks ago. Last Saturday good strawberries sold for seventy cents a quart box by the crate, and some exceptionally fine fruit brought the remarkable price of ninety cents a quart at wholesale. On Monday seventy-five cents was the lowest price asked for a single box of choice fruit. The probable reason for higher prices for southern strawberries so late in the season is the increasing demand from buyers for hotels and restaurants.

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Park Work near Boston.

IN 1893 the Legislature of Massachusetts passed an act which enabled the cities and towns surrounding Boston to coöperate with that city in securing open spaces for the use of the public, and the Metropolitan Park Commission was created to select and control these spaces. To the original Commission of Inquiry when it was making a preliminary study of this great park system the landscape-architect reported that long and continuous open areas, to be of the greatest benefit to the whole population of the metropolitan district, ought to be situated (1) on wooded and rocky hills; (2) along brooks and rivers, and (3) by the shores of the Bay and the sea. This thought, suggested by the geography of the district, has been steadily adhered to, and all the reservations created by the Commission belong to one of these three classes. In the report of the landscape-architects for 1895, published not long ago, it is stated that the areas now or soon to be controlled by the Commission include more numerous large pleasure-grounds than are governed by any public authority in North America, with the exception of the Governments of the United States and Canada. They comprise the Blue Hills reservation, five miles long; the Middlesex Fells reservation, two miles square; Stony Brook reservation, two miles long; Charles River reservation, including the semi-public river-banks, five miles long; the Mystic Valley parkway, two miles long, and the Revere Beach reservation, three miles long. The development of a work of such magnitude has more than a local interest, and the annual reports of the landscape-architects, as they give a record of the progress of the work and unfold the design, make a series of documents of the highest value to all who are interested in providing recreation-grounds for a large population.

To descend to the details of the work reported during the year just passed it is to be noted that the chief attention has been given to revising the boundaries of the public lands. Commissioners who purchase land for public use are not in the habit of making any serious study of boundary problems, nor are they adequately equipped, as a rule, to settle them intelligently, and therefore almost every park in this country is disfigured or, at least, fails to

produce the highest effect because details which are essential to its completeness have been omitted or some incongruous feature has been included. It is not to be expected that a park line which follows property lines between private owners will include all that is essential and exclude what is not essential to its highest value. A sad example of this is to be found in our own city, where large park areas have been purchased with their boundary lines established by chance or, at least, without any serious study of their actual significance. Considerable care was exercised in the purchase of metropolitan park lands for the greater Boston, and yet we find in the report of Messrs. Olmsted, Olmsted & Eliot that many amendments in the boundaries of all these reservations need to be made. A strip of land is added here to permit the construction of a boundary road without injuring a row of fine trees; a winding tongue of land is added there to give access to the same park from an important highway; a triangle is added here and a sliver of land is added there, an irregular and useless tract is restored to its owner in another place—in short, the whole ground has been subjected to a thorough study, so that whatever is essential to the charm of the place may be retained, and every facility for reaching it by cheap and rapid transportation provided.

Meanwhile it is to be noted that no haste is made toward building substantial stone-filled and graveled carriage-roads through the reservations. It is true there are roadways now existing and others which have been built under the authority of local superintendents, and these, to a certain extent, have opened the reservations to the driving public, but it is admitted that these roads do not exhibit the scenery of the reservations as advantageously as it ought to be exhibited and as it will be shown in the future, and they possess bad grades and bad lines. Nevertheless, before a comprehensive scheme of permanent roads can be studied it is certainly better to adopt the plan of the Commission and avoid all expensive constructions. The money available for such wheelways is well devoted to the clearing out of new walks and bridle-paths, and marking them with guide-posts, until the completion of the study may make it possible to give the permanent carriage-ways their best location.

These reports furnish salutary reading for all persons who think that the sole, or even the chief, work of a landscape-architect or a professional designer of parks is to make pretty pictures of flowers, and grass, and shrubs and trees, or to erect structures for merely ornamental purposes. Unfortunately, too many landscape-gardeners have no more elevated professional ideals than this. They do not recognize the fact that true art is not the servant of some temporary fashion, but something that is to endure, and must, therefore, have a permanent basis in the necessities and aspirations of human life. In these immense areas of rugged hills and wooded slopes, sunny glades and sparkling watercourses, the greater Boston has acquired a property in scenery which has a positive and inestimable value for the health and refreshment of the people whose lives must be passed in the noise and confusion and rectangular ugliness which seem to be the essential conditions of life in thickly crowded cities. It is evidently not the purpose of the designers to trick out the noble features of these northern landscapes with exotic vegetation or with incongruous bits of architecture, but to restore and retain, as far as possible, the original poetic charm of the place, which is its essential value. Balustrades and terraces and parterres of flowers or any other artificial ornaments are sorry substitutes for a real woodland walk or a group of noble trees like the Waverly Oaks, or a look over the restless sea. It is real nature and not affected naturalism that soothes the city-wearied spirit and has a genuine sanitary effect upon a mind harassed with business cares. Among these wild hills and shady defiles and extended views the active business man is furnished with the most certain relief from that nervous exhaustion which comes from the excitement and stress of city life, and the

poor can find that refreshment which the rich secure by expensive travel and luxurious establishments in the country. Public pleasure-grounds are possessions of rare value when treated with the full knowledge that they are to meet the elementary wants of the human soul by men who have a reverent love for nature, and whose primary aim is to develop the latent possibilities of the scenery on its poetic side and make these kindly influences accessible to all. They are more to be prized, shall we say, than great cathedrals or libraries or museums of science or art.

In the report of the landscape-architects for the Park Department of the city of Cambridge, Massachusetts, the most interesting portion is that which relates to the Cambridge Field, a rectangular playground, which is to have a central building as a meeting-place and shelter from showers, a band-stand, a check-room for deposits of clothing, skates and other articles, closets and wash-rooms, and a counter for the sale of light refreshments, etc. Inasmuch as experience has proved that whenever such a playground is treated in a makeshift way people are apt to abuse it, it is urged that the finish should be of the best, with arrangements ample and attractive, so that as soon as it is open it will become a success and will help to form good habits in the people who frequent the place. After explaining that the cost of maintaining the central building would be practically nothing, because some worthy person would take the position of caretaker without any other pay than the privilege of selling refreshments, sharpening skates, etc., the landscape-architects add:

Believing as we do in the great practical usefulness and value of the proposed building, we have, as you know, made it the central and dominating feature of our design for the whole field. In rural parks, buildings are rightly kept subordinate to the scenery; and to this end they are often given picturesque forms, such as blend easily with the foliage. In such parks buildings are best when half-concealed or even hidden. In a confined, level, formal and generally rectilinear public ground, like Cambridge Field, buildings should certainly, so it seems to us, both stand forth openly and possess a dignified architectural character. A rural cottage would be as incongruous in a formal square as a classic mansion would be in a rough New England pasture. If, therefore, the Commission cannot afford at this time to set up an appropriately substantial architectural structure, we would suggest that building be for the present postponed. The site allotted to the building on the plan may be kept open, and the two necessary but temporary small closet buildings may be conveniently placed in the spaces which are marked on the plan as intended for the children's and girls' playgrounds. We are quite sure that this course will prove wiser than would be the immediate construction of any building which would not correspond in style and appearance, as well as in use and convenience, with the general plan for the Field.

We are glad to know that a building of dignified character has been designed and that work will begin on it at once, and we agree with the landscape-architects that such a house will so enhance the value of the Field to all who may frequent it, and particularly for women and children and babies, that it will more than repay its first cost.

Some Native Ornamental Grasses.—II.

MOUNTAIN RICE, *Oryzopsis membranacea*, is a remarkably pretty grass, with large open panicles of white, silky, hairy spikelets. In the Rocky Mountain region, where it abounds, it is esteemed as one of the Bunch Grasses. One of the plants that have received the name of Hair-Grass is *Muhlenbergia capillaris*. It is impossible to exaggerate the beauty of this plant with its red-purple, hair-like panicles that bend before the lightest breeze. *Muhlenbergia Texana*, a species inhabiting the dry plains of the south-west, has a similar, but much smaller, panicle.

Tussock-Grass, *Deschampsia cæspitosa*, native of the cooler parts of both hemispheres, is a rather elegant grass. Especially so is a variety found in the mountains of Colorado and Wyoming, with tufts of short fine leaves and a

panicle tinged with bronze and purple. In the Appalachian region *D. flexuosa* is not infrequent, dwelling upon rocky ledges. The slightly bending panicle is of a chestnut-brown color, and has a certain delicate grace that makes it a very attractive plant.

The group of grasses known to botanists as the tribe Chlorideæ comprises more showy and ornamental species than almost any other. Some of the species of *Chloris*, the genus from which the tribe takes its name, are cultivated for their beauty. They are easily recognized by their flower-clusters, consisting of slender spikes digitately arranged like those of the common Crab-Grass. In Florida two species, *C. glauca* and *C. Swartziana*, are notable for their elegance. They are smooth, glaucous plants with brownish spikes. *C. elegans* in the arid region of the south-west is a showy grass with densely bearded white or pinkish spikes. The Grama or Mesquit grasses of the prairies and the still drier region to the south are all of them pretty. Among them, *Bouteloua brevifolia*, a rare western Texan species with rigid stems and leaves and short spreading spikes, is particularly ornamental. Not less so is *B. prostrata*, which grows in tufts spreading out on the ground, and bears short, curiously curled spikes. Some of these small Gramas would be good plants for edgings.

The Toothache-Grass, *Ctenium*, of moist Pine-barrens in the south Atlantic and Gulf states, owes its popular name to a reputed virtue of its pungent root-stock. It is an odd grass and a handsome one. Its brown spikes are wide-spreading when young, but as they mature they curve inward, after the manner of a wounded centipede. This is one of our few fragrant grasses, the older plants having an odor like that of the Balm of old gardens.

Among the Melic-Grasses, *Melica*, there are some pretty species. The unarmed Nodding Melic, *M. nutans*, whose slender clusters of nodding whitish and purplish spikelets are to be seen in May on river bluffs in the eastern states, is worthy of mention. *M. spectabilis*, found in the Rocky Mountain region, has large showy, red-tinged spikelets and culms with a bulb-like base. One of the few of our native grasses sometimes seen in cultivation is *Uniola latifolia*, a truly beautiful plant with broad leaves of a singularly rich green and drooping panicles of flattened spikelets. It is a native of river-banks in the eastern states, especially southward. It has a preference for rich soil. Sea Oats, *Uniola paniculata*, is of quite a different aspect. Its stems and leaves are rigid and glaucous. The whitish panicles are very conspicuous, and are sometimes gathered and dried for winter bouquets. Sea Oats is found from Virginia to Texas on ocean beaches, where its strong root-stocks do good service in holding the drifting sands. The common Reed, *Phragmites communis*, is one of our largest and showiest grasses, much resembling the closely related *Arundo Donax*. It abounds in the coast marshes, where it grows with Cord-Grass, and about inland lakes and ponds. It deserves a place in every park or pleasure-ground where marsh or water plants can be grown. Another grass suitable for cultivation in aquatic gardens is the Reed Meadow-Grass, *Glyceria aquatica*, a large species often growing in shallow water. It grows wild across the continent northward. Water-fowl relish the seeds, which are produced in great quantity, and fish are said to eat them.

Squirrel-tail Grass, *Hordeum jubatum*, is a handsome grass with lustrous pale green or purplish spikes. On account of the long awns or beard it is sometimes a troublesome weed. It is quite an ornamental grass, but has a great drawback in the tendency of the spikes to break up as the seed ripens. This habit, perhaps, once existed in the related Barley, but has been cured by long cultivation and selection. *Arundinaria macrosperma*, the Big Cane of the southern states, is our only woody grass. It is not a handsome plant—is decidedly unsightly, in fact. But, as it forms almost impenetrable thickets, it might be useful for hedges and wind-breaks where the climate is sufficiently mild and the soil is sufficiently moist.

Besides these indigenous grasses there are a number introduced from the Old World and naturalized in various parts of the country that might be referred to in passing. Velvet-Grass or Meadow Soft-Grass, *Holcus lanatus*, is quite conspicuous in grass-lands by reason of its whitish color and the often beautifully pink or purple tinted panicle. Hare's-tail, Quaking-Grass and Hair-Grass, *Aira caryophylla*, are pretty grasses, sometimes cultivated, chiefly in Europe, for dry bouquets. They are mostly natives of the Mediterranean region, but now grow wild in various parts of North America. *Arundo Donax*, from southern Europe, is said to be established in Virginia and along the lower Rio Grande.

Only a few of our beautiful native grasses are mentioned here. There are others quite as handsome; and from the four quarters of the earth hundreds of ornamental species could be gathered. Grasses have been too long neglected in the flower garden. Planting them in the shape of lawns to be kept closely mown is not enough, for it does not allow the often graceful and delicately colored flower-clusters to be seen. Grasses are easily cultivated and require but a minimum of care. That they are more hardy than most plants, and less easily injured by transplanting, is shown by the readiness with which the natives of one country are naturalized in another when accidentally introduced. To what extent some of them may be improved for ornamental purposes by cultivation and selection remains to be seen; but, even as they are, many of them have qualities that entitle them to the recognition of the horticulturist.

Department of Agriculture, Washington, D. C. T. H. Kearney, Jr.

Spring in the Pines.

I AM writing on the 19th of April, and vegetation is further advanced than it ordinarily is at this date, and yet ten days ago, after an unusually cold March and early April, all vegetation in the Pines seemed at a standstill and the season was unprecedentedly late. But ten days of August weather, following hard after frost, has aroused the latent forces of nature to an activity which has been almost startling. We can hear and see the buds swelling and bursting, especially in the early morning and evening.

Whether we look or whether we listen,
We hear life murmur, and see it glisten;
Every clod feels a stir of life,
An instinct within it that reaches and towers,
And creeping blindly above it for light,
Climbs to a soul in grass and flowers.

No one ever saw the Bloodroot pushing up and spreading its white petals in such haste to meet the sun. Trailing *Arbutus* and *Pyxie*, due to flower long ago, were held back by the cold, but under the genial influences of an hour they were both in full bloom. The red keys are hanging on the Swamp Maples, and the White Maples have already shed their flowers. March checked the Filbert and Alder tassels, which were shedding their pollen as long ago as February, so that there were some fresh catkins still left to open with the sudden warmth. The bursting buds of the Bayberry are crowding off the old but still green and fragrant leaves from the stem, and the spicy aroma about the *Sassafras* tells us that its flowers are opening. The *Amelanchiers* have been somewhat tardy, but they are now covered with bloom like the other early-flowering trees. Some of the dwarf Willows in the Pines are exceedingly handsome now, with their flowers ranked thickly along the stem; the deep scarlet stamens, just before they shed their pollen and later as they expand into yellowish fluffy flowers, make them most desirable shrubs for a spring garden.

After all, the bursting of the leaf-buds and the sudden expansion of the leaves seem more wonderful, if possible, than the opening of the flowers. To-day a tree is enveloped in a soft haze of light yellow or a greenish mist and to-morrow it waves boughs of foliage dense enough for shade, and in the deciduous woods here the range of varied

color is beyond all description. In the garden, Cherries and Plum trees are fragrant with their white flowers, while Peach and Almonds with their rosy blossoms add to the picture. Even the Apple-trees are showing the pink tips of their flower-buds, an unusual spectacle in mid-April. The Japan Quince and *Exochordas*, the early *Spiræas* and *For-sythias* are at their very best, and so is the *Akebia* with its chocolate blossoms.

The effect of this midsummer weather upon the birds is amusing. It is very plain that they imagine they are behindhand in their work. Three robins have constructed nests near my house, two of them building after the normal fashion, with mud foundations, but the third evidently feels called upon to do something out of the ordinary, and is trying to found her house on a few dry twigs and a quantity of chicken feathers. The nest is in a Hemlock near the ground, so that we have no difficulty in watching its progress. The bird hurries to the chicken-yard and selects long feathers, so that she can weave them in with the twigs. But it is a novel kind of architecture for her, and she is making an untidy mess of it. Her mate does not assist in the building, but perches himself on the naked branch of a Mulberry-tree near by, and when she arrives with her load of feathers he looks at her in such a comical way that one can almost hear his comments on her work. Plainly she has caught the spirit of the age, and, like the new woman, she will not be bound to the traditions of her race. A pair of golden-winged woodpeckers are making an excavation in a Maple within a few feet of the house. These large and beautiful birds are joint partners in this work as well as in other household affairs. One of the pair will work vigorously for a time, and then, promptly responding to a call, the other will come to take its place at the hole, while the first retires to a distance and keeps guard. Let me approach ever so cautiously that side of the house where the tree stands and the watching bird will sound the alarm, the tapping ceases instantly and the head of the worker is thrust out to investigate. If I approach nearer it flies away, but if I slowly move off it soon begins work. Thrushes, wrens, song sparrows and vesper sparrows are filling the air with glad music; insects are buzzing among the flowers and butterflies are flitting here and there; in fact, the whole scene is filled with action where but ten days ago every sign of life was locked up in frost.

Vineland, N. J.

Mary Treat.

Foreign Correspondence.

London Letter.

PARROTIA JACQUEMONTIANA.—This is now flowering for the first time in the arboretum at Kew. It differs from *Parrotia Persica* in having smaller flowers arranged in a conical head and surrounded by ovate petaloid whitish bracts nearly an inch long. The flowers are developed before the young leaves. When mature, the leaves are orbicular or obovate, distinctly toothed all around the edges, dull green, and they do not assume the bright colors in autumn so characteristic of the Persian species. The former is a native of Kashmir at an elevation of from 5,000 to 9,000 feet, where it forms a Hazel-like bush, six to twelve feet high. Dr. Aitchison found it in abundance in Afghanistan in the interior of the hills, forming much of the shrub jungle there. He says the long slender stems and pliant branches are used in wicker-work and for the handles of farm implements. As a garden plant it is not as valuable as *P. Persica*, which at Kew forms a beautiful shrub or small tree, bearing large glossy green leaves all summer, which in autumn change to the richest hues of orange, red, brown and yellow.

WIDDRINGTONIA WHYTEL.—The Milanji Cypress, as this plant is popularly known, has been largely distributed from Kew by means of seeds and young plants. It bids fair to become a useful garden plant, and also, in countries favorable to its growth out-of-doors, a valuable timber tree. It was discovered in quantity a few years ago on the mountains of British Central Africa, where it forms large forests,

and the wood is so valued there that Sir H. H. Johnston, Her Majesty's Commissioner in that territory, has taken steps to protect the remnants of the forests and to plant more on an extensive scale. According to a report recently made there are about 150,000 large trees covering some thousand acres, with an average of forty cubic feet of timber in each tree, which is valued at three shillings per foot. The destruction from forest fires, etc., has recently been so great that "it is no exaggeration to say that five or six years' more delay in the assumption of control over the remaining forests would have meant the entire extinction of this unique conifer." It grows to a height of about 150 feet, the trunk being six feet in diameter at the base.

PRUNUS PSEUDO-CERASUS.—English horticulture has only recently become acquainted with the value of this beautiful spring-flowering tree, but now it is certain to be soon abundantly represented. I first saw it in the nursery of Mr. A. Waterer, at Knap Hill, where it was called *Prunus Watereri*. Messrs. Veitch & Sons exhibited it last week before the Royal Horticultural Society, and in the last issue of *The Gardeners' Chronicle* there is an excellent illustration of it. Young trees of it at Kew are at the present time literally laden with beautiful, large, rose-tinted or white flowers in crowded clusters; a yellow-flowered variety is also in bloom at Kew. The Japanese nurserymen recommend it as a street-tree, and offer about a dozen named varieties characterized by white, various shades of pink, greenish white, single and double flowers. The wood is also said to be invaluable for engraving. As a spring-flowering tree *P. pseudo-cerasus* deserves to rank with the Almond, double Red Peach, *P. triloba* and *P. Mume*. The last-named is also offered in considerable variety by Japanese nurserymen, who call it the queen of Japanese trees.

PRUNUS SPINOSA FLORIPLENO.—One of the most attractive shrubs in flower in the arboretum at Kew is a bush of a double variety of the Black Thorn, its branches being thickly clothed with clusters of pure white flowers, composed of many petals spreading outward and showing a bright green eye. The black bark of the branches heightens the effect of the pure white, and when the sunlight is upon it the bush appears to glisten like snow. This is a plant of exceptional merit, and is as hardy as the Black Thorn.

PRUNUS TRILOBA.—I omitted in my last letter to emphasize the fact that this plant should not be grafted on to another species, as is too commonly the practice among nurserymen. Grafted plants of it invariably die young. It may be increased by layering or from suckers, and when on its own roots it goes on happily for many years.

PRUNUS GRAYANA.—This is now in flower at Kew. It does not appear to differ from *Prunus Padus*, the Bird Cherry. The Kew plant was obtained from Dr. Dieck.

BERBERIS NEPALENSIS.—This noble species is hardy only in the warmer parts of England. In Cornwall it is represented by large specimens, and I have seen it about fifteen feet high in a garden near Dorset. At Kew it does not grow well, and is injured by frost in winter. The foliage of healthy plants is very ornamental, being pinnate, a foot or more long, with leaflets four or five inches long of a glossy green color. The flowers are in terminal erect heads nearly a foot long, very crowded, and colored bright yellow. According to Sir Joseph Hooker, it occurs in the temperate Himalaya at an altitude of from four to eight thousand feet, and also in the Nilghiri mountains. A form of it known in gardens as *Berberis Bealei*, a native of Japan, has even larger leaves than the type. It is grown in the temperate house at Kew, and I have seen very fine specimens grown as pot-plants for the conservatory. I saw a magnificent specimen of it in the garden of Colonel Tremaigne in Cornwall, where it is grown as *B. Japonica*, var. *Bealei*.

BERBERIS BUXIFOLIA.—This Chilean species, known in gardens as *Berberis rotundifolia* and *B. fascicularis*, a variety of the common *B. Aquifolium*, are two of the most attractive shrubs in flower here now. Bushes of the former, six feet high and eight feet through, are covered with pend-

ent balls of bright golden yellow, and suggest *B. Darwini*. The other plant is remarkable for the numerous clusters and bright yellow color of its flowers, far brighter than any other form of *B. Aquifolium*.

SAXIFRAGA STRACHEYI.—Flowering examples of this species were shown a fortnight ago by Mr. G. Paul, and obtained a first-class certificate. Although introduced from the Himalaya by Sir Joseph Hooker in 1851 and cultivated out-of-doors at Kew for many years, it has not become popular, probably because it is not so hardy as its ally, *Saxifraga ligulata*, although it is handsomer than that species. At Kew it is grown on the rockery, where its thick contorted prostrate stems embrace and nestle against the gray stones in a partially shaded position. Here it has grown freely and flowered profusely every year. The leaves are deciduous and the flowers are developed in March or April before the new leaves appear. In colder localities it ought to be protected in winter or lifted and placed in a frame till danger is over. The flowers, which are borne in large cymose clusters, are an inch across, white, tinted with rose. There is a yellow-flowered variety. *S. Stracheyi* is a native of Kashmir at an elevation of 8,000 to 14,000 feet.

PINGUICULA CAUDATA.—A few pans of this pretty Butterwort help to liven up the greenhouse in the early months of the year. At Kew it is grown along with the Mexican Orchids and thrives satisfactorily. The plants go to rest in winter when they are kept moderately dry. They are again started into growth in February by repotting them into new soil and placing them on a shelf in a temperature of about sixty degrees. At present they are in full flower and are as effective as large-flowered *Masdevallias*. A stock of plants can easily be raised by breaking off the outer leaves from the plants when at rest and planting them in sand in a propagating-house. It is now fifteen years since this species was introduced from Mexico by Messrs. F. Sander and first flowered at Kew. If a number of plants are grown and started in batches a succession of flowers may be had from spring until late in the autumn. Seeds are ripened freely, and from them some variation in flower-color has resulted. Good varieties have flowers two inches across and of a brilliant crimson color.

NARCISSI.—Flowers of these plants among grass are a delightful feature if tastefully planted. I have lately seen attempts at this kind of wild or natural gardening in some of the London parks which are an utter failure, owing to the formal massing of the bulbs. Anything in the nature of a strict outline must be avoided. At Kew the bulbs are planted so as to look as natural as possible, here and there a thick colony with a few stragglers and smaller clusters, finally thinning down to nothing. They are most effective when planted on lawns where trees are numerous and especially where conifers and deciduous trees are mixed. In such situations a glade-like effect is obtained. In one part of the garden the *Incomparabilis* and *Poeticus* varieties have been planted so extensively among the grass that they present the appearance of a meadow overrun with Daffodils. The bulbs of these plants are now so abundant and cheap as to place such a display as is here described within the means of all gardeners. But the bulbs must be planted with taste.

London.

W. Watson.

New or Little-known Plants.

Rose, Mrs. Pierpont Morgan.

THIS comparatively new Rose (see opposite page), which is much admired, and promises to be an important commercial variety, is a sport from the well-known Tea Rose, *Madame Cusin*. It is a strong plant of good habit, and it grows vigorously under glass, making sturdy stems with luxuriant foliage and producing a flower on every shoot. Good judges pronounce it the most prolific of all Roses for greenhouse cultivation. The flowers are larger than those of *Madame Cusin*, and when fully developed are as large as those of the Hybrid Perpetual class, being at



Fig. 28.—Rose, Mrs. Pierpont Morgan.—See page 174.

their best four and a half or more inches across and very full. The color is an even shade of cerise-red, with a delicate tint of lemon at the base of the petals, which makes an exceedingly brilliant combination under artificial light, while it is pleasing at all times. The petals are broad and heavy, and they last a long time on the plants, and when cut. To give an idea of their keeping qualities, Mr. John N. May, of Summit, New Jersey, with whom this plant originated, cites the fact that a dozen of these roses were cut with long stems on the 26th of December, 1894, and sent to England. They were kept until the 15th of January, when they were exhibited at the Royal Horticultural Society of England, and, although they had then been cut twenty days, the judges found them in sufficiently good order to deserve an award of merit. Cut roses of this variety have been repeatedly shipped by express from New Jersey to Omaha, Denver and other remote western cities, where they arrived in perfect condition.

Cultural Department.

Orchid Notes.

CALANTHE REGNIERI is a useful terrestrial Orchid. Just as *C. vestita* and its varieties and *C. Veitchii* are going out of bloom, the flowers on this plant begin to open and continue until near the end of April. It is a deciduous plant, losing its leaves just before the flowers open, and it is, therefore, destitute of leaves while the plants are blossoming. If the plants are arranged among the handsome-leaved *Cypripediums* the deficiency of foliage is not observed, and the racemes show to good advantage. The pseudo-bulbs are four inches long or more, flask-shaped and jointed, and the flowers are in racemes on long stems, which attain a height of two and a half to three feet. The flower-stem grows straight for about eighteen inches high and the remainder bends over gracefully. The flowers are of pleasing colors, the sepals and petals white, and the lip rosy-pink. This *Calanthe*, like all the deciduous ones, needs a thorough rest. After the plants are done blossoming they should be put in a dry warm place and water entirely withheld. As soon as they begin to grow, the plants should be turned out of the pots, all the exhausted soil removed and the old roots shortened back within about an inch of the pseudo-bulb. They should then be planted singly into four or five inch pots, according to the size and strength of the pseudo-bulb. Fibrous loam, with a small quantity of lumpy dried cow-manure, makes a good compost. After the plants are potted but little water is needed until the roots have taken hold of the fresh soil. When the pots are well filled with roots a weak solution made from fresh cow-manure should be given once or twice, as the plants may need it. Little water is needed when the pseudo-bulbs have attained their full size, and when the plants are in bloom they need just enough water to keep the flowers from drooping.

One of the handsomest *Cypripediums* in bloom now is *C. hirsutissimum*. The flowers are very pleasing, the different shades blending admirably; they measure five or six inches in diameter and are produced singly from the young growth on large scapes which measure nine to twelve inches. The dorsal sepal is large, of a reddish purple color, with a margin of clear green. The lower sepal is rather small and also of a reddish purple color. The petals are large, spatulate, twisted, hairy along the margins and narrowed down to the base. The lip is deep green, tinged with lighter green. The flowers of this plant, like many others belonging to the genus, if properly looked after, will last for many weeks. The leaves are dark green, strap-shaped and nearly a foot long. *C. hirsutissimum* likes heat and moisture and grows well here in the stove.

Another good *Cypripedium*, and one that flowers freely and is also easy to grow, is *C. Boxallii*. It is a stemless plant and has thick, dark green strap-shaped leaves, which measure nearly a foot in length. The large showy flowers on our plants are produced singly on erect scapes. The dorsal sepal is of a greenish color and the edges are white, with numerous purple spots. The petals and the lip are of a greenish yellow, tinged with purple. The flowers are distinct and have a shining appearance. It is of easy cultivation, and although often recommended for an intermediate house, it does well here in a stove temperature and produces large flowers freely. The flowers have exceptional lasting qualities, and some have been on the plants for more than two months.

A large plant of *Arpophyllum giganteum* has blossomed satisfactorily here. It is grown in a large square basket which is suspended near the roof-glass, and has produced fine, large spikes of rosy-purple flowers. It is a strong-growing plant, with drooping, strap-shaped leaves twelve to fifteen inches long; when first developed they are of a bronzy color, but later they take on a deep green. The inflorescence is a dense spike made up of numerous small rosy-purple flowers produced on stout stems. This *Arpophyllum* grows vigorously planted in a deep basket in fern-root mixed with sphagnum-moss. While growing it needs plenty of water and abundance of light. The temperature of the house where it grows ranges from fifty to fifty-five degrees, Fahrenheit. It is a native of Mexico and Guatemala, and was introduced from there to England in 1839.

Botanic Garden, Harvard University.

Robert Cameron.

The Cultivation of Nepenthes.

NEPENTHES need close attention at this time of year when they are just beginning the period of most active growth. It depends altogether on their treatment for the next month or two whether the pitchers will be abundant. These last for the better part of a year on the plants, and on some kinds even longer. Without these curious adornments the plants, like some Orchids without their flowers, are anything but attractive to the ordinary observer.

Old plants of *Nepenthes*, as a rule, do not give as abundant crops of pitchers as plants one and two years old, but they are usually larger than those on young plants.

All the sorts are interesting, but they are not all easy to grow. The cultivation of some species is but little understood, and, indeed, the conditions under which some grow naturally cannot be imitated in a greenhouse. For instance, Burbidge, in his *Gardens of the Sun*, says in Borneo some species thrive luxuriantly on the summit of a hill on which, during daytime, the heat to a European is almost unbearable, while in the early morning the temperature is so low that a heavy winter overcoat is needed by the traveler. Those forms and hybrids which have originated in gardens are much to be preferred to the species on account of the ease with which they can be grown. The hybrid called *Mastersiana* is one of the very best, as with ordinary care a good-sized and very prettily colored pitcher at the end of each leaf may be counted upon. It is also one of the easiest to root from cuttings. The pitchers average six inches in length and two and one-half inches in diameter, and the color is dark red. *Nepenthes Dominiana* is an old garden hybrid, very free-growing, and has the further merit of succeeding in a lower temperature than most of the others. The color is yellowish-green spotted with brown.

Quite a number of American hybrids have been raised in recent years, and these include some specially beautiful sorts. One, named *Nepenthes Morganiae*, is almost rose color, and forms a very symmetrical plant if kept dwarf. *N. Amesiana*, *N. Siebrechtii* and *N. Dormanniana* are closely related to each other, evidently springing from the same parentage. The pitchers are very large and more nearly round in outline than the first three named. *N. Claytonii* has long, narrow, dark-colored pitchers.

A very essential point in the cultivation of *Nepenthes* is the frequent use of the knife. It is a mistake to allow young plants to grow tall. If they do not show signs of forming pitchers they should be cut back to within three or four leaves of the root, and even when they do form pitchers after a sufficient number of leaves show, the growing point should be nipped out. This will cause the pitchers which are developing to become much larger than if the shoot is allowed to grow.

The material in which to grow these plants should consist of rough fibrous peat and chopped sphagnum-moss in equal parts, and a third part made up of rough sand, charcoal and broken pots, all thoroughly mixed together. The plants thrive best in wooden baskets suspended from the roof of the greenhouse. They should be protected from strong sunshine and from currents of air. They delight in a hot moist atmosphere and need an abundance of water when in active growth, most of it to be supplied by frequent syringings. When the material in which they grow becomes decomposed it should be carefully washed from the roots and renewed, an operation to be performed only when the plants are not in active growth.

Propagation is effected most readily from cuttings of the ripe growths. If the ends of the cuttings be pushed through the holes of inverted three-inch pots and plunged in sphagnum-moss in a close frame they will send out strong roots in a few weeks. The plants should then be potted off singly in small pots, care being taken to bruise the roots as little as possible.

Botanic Garden, Washington, D. C.

G. W. O.

Flower Garden Work.

SPRING has opened very late this season, and now, on the tenth of April, frost is still in the ground in many places. Outdoor work has been considerably retarded, but if steady warm weather sets in soon this will make a more prosperous year than early warmth followed by hard frosts.

It was feared that the losses from severe cold would be great owing to the low temperature early in the winter before much snow had fallen. This fear has proved well founded with the hardy Roses, at least, and many gaps will need filling up. This work should not be delayed longer than need be after the soil can be stirred, and dormant stock is the best to procure. We used to think that Roses on their own roots were best, but subsequent experience of the New England climate has disproved this, and there is no doubt that where a gardener is sufficiently intelligent to distinguish between the brier-shoots that will sometimes sprout from the stock, that the grafted or budded Rose is the most vigorous and the hardiest, and will produce better returns in the garden than Roses that are on their own roots. Another mistake often made is the planting of too many kinds in the hope of getting up a large collection of hardy varieties. Our experience has been that of the known kinds of reputed hardy Roses not more than one in ten is to be relied on year after year in this climate, and it is safer to use fewer kinds and plant more of them. Pruning is again reduced to a very simple operation this season. It consists in cutting out the dead portions and leaving the live ones, and this in most cases is too hard pruning to get the best returns.

The Narcissus border looks well and promises a good show of bloom soon. We feared that lack of protection had hurt these bulbs, but there is every prospect of as good a show as in former seasons of the kinds regarded as suitable for this climate. It is well to go over the beds and stir the soil up a little as soon as it is dried up sufficiently to close up the surface left open by frost. This will help to retain the moisture that is in the soil for future dry periods. If it is intended to use the blossoms for indoor decoration it is wise to put a slight mulch over the beds to prevent April showers from splashing the flowers with soil. This often happens, and a slight mulch saves the blooms from disfigurement.

Mixed herbaceous borders should be looked over now to see that none of the smaller growing plants have suffered from frost. It happens frequently that these are raised out of the ground by the action of frosts, and they will need to be replaced carefully and made firm. *Mertensia Virginica* has seeded freely here in the borders, and the young plants are often lifted out of the soil in this way. It is one of the prettiest of spring flowers of which too many cannot be had, but they need this attention at this season. *Primula Sieboldii* that are planted outside are covered in the fall as are the *Polyanthus*, and they then winter over well, but all coverings must now be removed to anticipate growth which will soon follow.

Beds of Lily-of-the-valley not covered with manure in the fall will be helped now by a covering of some good material, not too lumpy, so that the young shoots can come through freely. This will enable them to build up a strong growth for the next year's flowering. We always cover these plants in the fall, and the covering acts as a mulch as well as a fertilizer. It is not removed in spring, but left to enrich the plants permanently. It is surprising how the plants show their appreciation of this little attention. This is a good time to make a bed of the Lily-of-the-valley. The best Berlin pips or crowns should be procured and planted about eight inches apart each way in good soil in a position shady during the heat of the day, and they will be sure to give entire satisfaction in after years.

Any other planting in the mixed borders should be deferred until the plants already in place have made a little start, or some plants will be disturbed that should not be. After such herbaceous plants have made a little growth the root-action will go on with little check and will make a strong growth the coming year, provided the soil is well prepared beforehand. Plants that have been raised from seed with a view to transplanting in the garden must be well hardened off before setting out, as, though they may be perfectly hardy under normal conditions, they have been rendered as susceptible to cold as if they were of tropical origin and are as easily injured at this season. A few weeks in the cold frames, with plenty of air on warm days and nights, will make them sufficiently hardy to plant out in their permanent positions at the end of this month, or a little later in some localities. It is a part of each year's work at this time to look carefully through the borders to take out all self-sown seedlings that are not needed. These will come up in quantity all over the beds, and are usually weedy, poor variations from the type plants, so much so at times as to give rise to the suspicion that good forms of some garden

plants revert to the original types. But more often it is because the better and weaker plant has been made yet weaker by seeding freely, and its place is soon taken by a host of its progeny that in many cases are worthless. Phlox, Aquilegias and Larkspurs are plants of this description, and seedlings should be rigidly excluded from the borders other than those in semi-wild places. Here they may be allowed to care for themselves, and it does not take long for them to revert to the original types if left to their own devices. The strongest survives, and in most instances it is the weediest.

South Lancaster, Mass.

E. O. Orpet.

[This article was written before the untimely warm wave of mid-April, and should have appeared last week. Its suggestions, however, are still seasonable.—Ed.]

Chrysanthemums.

OUR stock plants of Chrysanthemums in cold frames will now furnish us with abundance of thrifty cuttings, and these will make much more satisfactory plants than stock secured from dealers. No grower ever thinks of getting a specimen bloom from a dealer's plant—that is, by growing it on. What he hopes for is to get his plants early enough to start them into new growth and take fresh cuttings. This he can do if he receives them in March. April is too late. Some of the stock sent out this season has been poor and late. There is no reason why dealers should not send out good strong stock. They know the importance of it as well as the grower does.

During the first week of May we shall put in our first lot of cuttings for specimen blooms. A month later will do if only medium-sized blooms are required. The cuttings will root easily without bottom-heat. A close propagating-frame is best, and the cuttings should be inserted with as little delay as possible. It will be necessary to shear off a few leaves and the tips of the upper ones. If allowed to lie on the wet sand they will be liable to decay, and damping may set in throughout the bed. Abundant watering will be required for the first week or so, and, in fact, we keep our cuttings drenched. The frame will be better for being kept closed and well shaded during the daytime and opened at night. Roots should begin to form in a week or so, and gradually the young plants should be more and more exposed to better light and air. They will be ready to pot off in three weeks. No check must be allowed from this time forward, for, whether intended for pots or benches, they must be kept in active growth.

There is no doubt the growing of large blooms has been overdone and that we shall see more medium-sized flowers. The plants would then be more diversified, and naturally make a more effective display. As cut flowers large blooms are imposing and very effective for the decoration of churches and other large buildings. They are less suitable than smaller flowers for artistic work in the parlor and for table decoration.

Our specimen plants will soon be ready for the final shift into ten and twelve inch pots, in which they will bloom. It is important that the drainage be free, and a little broken charcoal helps to keep the soil sweet. The soil recommended for previous transfers will do for this, although it may be heavier. We pot moderately firm, but never pound the soil. Watering must be done carefully until the plants are well started into growth, but on no account should they become waterlogged. Stopping must be done almost daily, and it is important that the plants be kept regular in outline.

Wellesley, Mass.

T. D. H.

Early Spring Flowers.

THE unexpected is due at any time in the garden, and in the short interval since my last note a few days of untempered sunlight have brought the Lily-pads to the surface of the water, burned up the early flowers and developed a succession of late spring flowers in abundance. It is, perhaps, not too late to offer a few hints as to the very early plants, which are practically all bulbous ones. The best early color-effects in the garden here are to be had from the blue flowers, as this color harmonizes better with the prevailing bare earth. For this color we depend on Scillas, Irises, Muscari, *Crocus Imperati* (reddish purple) and *Chionodoxas*. We have earlier flowers than these in the Snowdrops, but, however welcome and fascinating these may be, they are not very effective with us as garden plants, for at their flowering time the grass, which would prove an effective foil to their beauty, seldom shows a trace of green. There are also white forms of all the blue flowers mentioned, the white *Scilla Sibirica* and white *Chionodoxas* being especially beautiful, but they are, unfortunately,

not to be had in quantity and do not increase truly from seed. My friends who work constantly in growing seedlings of choice or abnormal varieties of such plants always have plaintive tales of reversion to the type, or failures to secure improved forms. The *Chionodoxas* seemed to me to be wonderfully varied this year, but while, perhaps, a dozen quite distinct forms could be picked out, it does not seem worth while to name them, except *C. Luciliae*, *C. Sardensis* or *C. grandiflorum*. Of these, *C. Sardensis* varies the least, having only two forms, a dark purple with either a white or dark eye. *C. grandiflorum* would cover all the broader-petaled large-flowering kinds, mostly slaty blue, with red and white varieties. *C. Luciliae* would well name all the others with purples and white, blue and white, pure white, and pink. *C. Tmolu* has a claim to name, appearing very distinct in masses, but it would soon disappear among *C. Luciliae*. In fact, no collection of *Chionodoxas* could be kept distinct very long, for they come plentifully from seed, and this is mostly cross-fertilized by the insects of the season. These flowers are visited here mostly by a winter-flying insect, which is either the *Chrysanthemum*-fly or a similar insect. And as it is simply out to eat, and not to store nectar, it visits all flowers indiscriminately, or in rotation, and carries pollen not only to the various *Chionodoxas*, but the *Scillas* (of the same family) as well. The cross, *Chionoscillas*, is often noted by gardeners.

The *Narcissi* are now in full glory. They are all so satisfactory that it seems invidious to mention names, only more of them should be planted in grass. The best varieties to select for this purpose are the cheapest obtainable, being naturally the most vigorous. But even the *Daffodils* look pale in contrast with the rich yellow of *Iris orchoides*, one of the most satisfactory plants of the season, free-flowering, beautiful, distinct, perfectly hardy and rapidly increasing from year to year. It is, perhaps, the best of the bulbous *Iris*s. The first of the always welcome *Tulips* have opened, and there is a promise of great bloom, though, as usual, there are too many immature or one-leaved plants, which will not flower.

Elizabeth, N. J.

J. N. Gerard.

Tulipa sylvestris.—This Tulip grows sparingly in deciduous woods in most countries in Europe. It is one of the most attractive of wild flowers, and it is as eagerly sought after by botanists as the rarest of Orchids. Its chaste yet bright color, graceful habit, in which it is superior to most cultivated Tulips, and its delightful fragrance make it one of the most desirable plants for naturalizing in wild parts of a park or garden. The flower, which is comparatively long, is more closed than those of the garden varieties, bright yellow within, slightly tinged with green on the outside. The leaves are linear, rather long and narrow. The species grows preferably in moist, open glades in level woodlands where the soil is deep and rich, without being wet, but also in more shady positions among trees and shrubs, where it flowers more sparingly than in the warm, bright sunshine. It forms little, scattered groups of great beauty, but is now becoming rare. The bulbs are much smaller than those of most other Tulips.

Newark, N. J.

N. J. Rose.

Correspondence.

Madison Square Again.

To the Editor of GARDEN AND FOREST:

Sir,—Your correspondent, S. A., in No. 425 of GARDEN AND FOREST, criticises the plan of Madison Square by Messrs. Bell & Langton because the centre of the park is formalized. I think the criticism just. He points out the symmetrical arrangement of paths as they exist, and says that the place is too small to contain formal as well as naturalistic effects. A seven-acre piece of ground is certainly too small for effects of wide green lawns if the centre is taken up with a rectilinear scheme covering more than an acre and a half. But seven acres are enough for naturalistic effects of respectable extent. Your correspondents (rightly, as I think) agree that formal features are desirable in a park of this kind. I do not believe, however, in the value of "symmetry" in lines of travel on a place of this size. This symmetry is not very obvious even on paper until emphasized by black lines, and it might be apparent to an observer hovering over it in a balloon. But how shall one who strolls into the square know that the path in which he walks is balanced by a similar one on the other side? Artists in landscape too often forget that their paper plans are deceptive. Cannot effects of wide green lawns, abundance of shade and so forth be combined in seven acres with the popular formal effects? I think they can by relegating the formal de-

sign to a part of the ground where it will not interfere with the appearance of size. I enclose a design as a suggestion.

The points of merit in this plan I think are these:

Lines of travel sufficiently direct are provided in all directions. Little attention is paid to the symmetrical look of the paths on paper, but much to the definite and harmonious effect of their lines when, laid out, a point of distinct æsthetic value. The formal design is put at the narrow end of the park, where it cannot interfere with the apparent extent of the ground. A circle is chosen (150 feet diameter) as the simplest

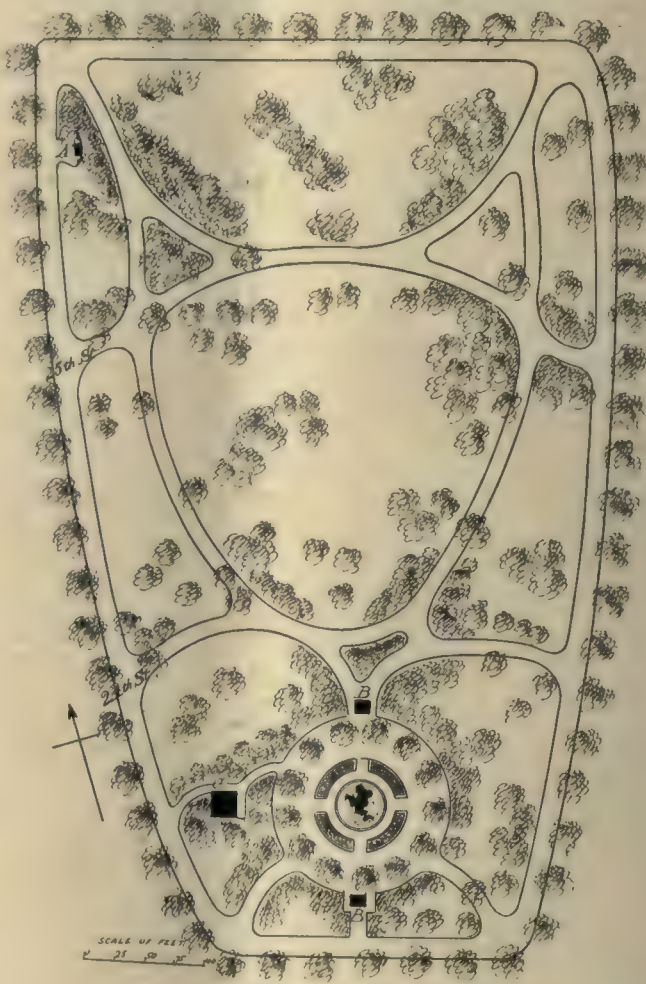


Fig. 29.—Proposed Plan of Madison Square.

and most obvious geometrical figure. It contains a row of trees along the circumference (surely an admirable place for seats in the shade), a Lily-pond and flower-beds. It is sufficiently separated from the naturalistic part of the park by trees and shrubbery.

Most of the existing trees are retained, and a good deal of shrubbery is added, to make the park interesting in detail as well as in general effect.

BB are the statues, C the kiosk, A the Farragut monument.

At the junctions of paths is plenty of room for seats.

Planting is intended to conceal the asphalt as much as possible.

Pittsburg, Pa.

H. A. Caparn.

Early Wild Flowers in Southern California.

To the Editor of GARDEN AND FOREST:

Sir,—Spring-time comes here after the first heavy rains, which may be early or late. The rainfall during the past winter has been so limited that we have had the unusual experience at times of something like drought in the rainy season, and this has interfered greatly with the regular growth of native plants. In February, *Dodecatheon Meadia*, which the children call Shooting Star, was in bloom, and with it came the oddly colored rich brown flowers of *Pæonia Browni*. The scarlet-flowered *Gooseberry* was also in bloom, and a shrubby *Lupin* with long spikes of purple-blue flowers, sometimes six feet high, with a head as many feet through, was also in flower. In March the *Eschscholtzia*, or California Poppy, was in full

glory, covering acres near the base of the Sierra Madre Mountains, above Pasadena. In the rear of my house, in the suburbs of Los Angeles, a mountain peak rises to the height of fourteen hundred feet, and from its summit on a clear day I have seen with the naked eye the rich golden color of these Poppy fields twelve miles away. Another but much less common member of this family is *Dendromecon rigidum*, with pure golden-yellow flowers, containing not a trace of orange, but otherwise resembling those of the *Eschscholtzia*. I have lately seen specimens of it six or seven feet high and five feet in diameter and well furnished with bloom. It certainly is a plant worth introducing to our gardens, although it is transplanted with difficulty and is hard to raise from seed. It is in full flower during March and April, but continues to bear a few flowers for several months. This is the only member of the Poppy family known to me which is a true shrub, but Dr. Franceschi reports that on an island near Santa Barbara there is a less rigid species called *D. flaccidum*. The first of the *Calochorti* to appear here is *C. Catalinae*, with large white flowers delicately shaded with purple and dark spots at the base of the petals.

Los Angeles, Calif.

E. D. Sturtevant.

Early April in Southern California.

To the Editor of GARDEN AND FOREST:

Sir,—A note of what one sees and hears during a stroll through a California garden in a morning in early April may interest eastern readers, whom we think of with some compassion as we read in telegraphic dispatches of snow-storms and freezing weather. Giant Callas lift their creamy chalices under the bay-window above the dark green of such leaves as I have never seen elsewhere, and against the side of the house tall Fuchsias are trained and thousands of their pendulous flowers are swinging in the breeze, while up the pillars and along the frieze of the portico great starry blooms of hybrid Clematis show white and shades of blue. On either side of the steps are huge bushes of Heliotrope, and a tangle of *Cobæa scandens* has climbed up an angle of the building and is covered with flowers of exquisite form and changing color.

Out in the garden are bushes of Marguerite, seven or eight feet in diameter and nearly as high, white with daisy-like flowers, but they are still more impressive when seen in the light of a full moon, when they have a fairy-like grace and an indescribable silvery glitter. The Lilacs have done blooming. The Laurestinus is almost done, but the Snowballs and Philadelphuses are in perfection. The show Pelargoniums are just opening, although the Zonal Geraniums are always in bloom. A few late Tulips linger in the bulb-beds with a few Narcissi, Ranunculi, Anemones, Ixias and Spiraxes. German Irises, with their wealth of color and Orchid-like texture, are making a noble display, and the Japanese Iris, a midsummer flower with you, will soon appear. Carnations are to be gathered every day, and the Chinese Honeysuckle which riots over a stone wall is also constantly in flower. Sweet Peas are opening on long wire trellises; Verbenas are gorgeous masses of color; Tropæolums are ablaze with spicy blossoms half-hidden in lush-green foliage, and the velvety faces of the Pansies now wear their best expression in this cool damp weather.

But the glory of the garden now is the Roses, for, although we have Roses every day, this is the time of their perfection. Tea Roses are especially handsome now, not only on account of their flowers, but on account of the young foliage in shades of olive, bronze and red, while the sprays of the Lady Banksias, sometimes twenty feet long, are covered for their entire length with tiny fragrant blossoms of white and yellow. Of course, it is impossible to describe a Rose or a Rose garden, but one who visits the southern coast of California at this season always feels that the cool beauty of the white La France, the blaze of the General Jacqueminot and the deep gold of the Maréchal Niel are never seen in such perfection elsewhere.

Los Gatos, Calif.

Imogene E. Johnson.

Recent Publications.

Traité des Plantations d'Alignement et d'Ornement dans les Villes et sur les Routes Départementales. Par A. Chargueraud, Professeur d'Arboriculture de la Ville de Paris. Paris: J. Rothschild. 1896.

The unfavorable comparisons which an American visiting Europe must make between the trees in his own cities and those which he finds in the streets of Paris and other Continental cities will be explained when he remembers how carelessly and inefficiently tree-planting in American cities is performed, when it is done at all, and then learns

by reading this manual how carefully and systematically the work is done in France. Tree-planting in Paris is done by studiously considered and intelligent rule. The amount of soil and its quality for each tree is established, the particular variety of tree is selected with reference to the width of the streets and the height of buildings, and every precaution is taken to insure success by the selection of healthy, carefully pruned individuals, which are planted in the most thorough way, by protecting them from injury and by providing them, by an elaborate system of underground pipes, with a sufficient and regular supply of moisture. As a rule, in this country, any tree, however crooked, ungainly or defective, is good enough to plant in our streets and public parks, and the operation of securing shade for our city streets usually stops after the tree has been thrust into a hole, as often dug in masons' débris as in good soil, until the time comes, a few years later, when the professional tree-butcher or the lineman of some wire company comes along and disfigures it for life. In Paris, however, good trees are considered of sufficient importance to authorize the expenditure of time and money to secure them. From the official figures of the Department of Public Works of the city of Paris it appears that the cost of planting a street-tree sometimes amounts to 215 francs and 25 centimes, or, roughly, from \$40.00 to \$50.00. This includes the cost of the tree, which is put at only \$1.00, the digging of a suitable hole and filling it with good soil, the drain-pipes, tree-protectors and an open iron grille which allows air and water from the sidewalk to reach the roots. Where the soil, however, does not require renewal and the grille and drainage-pipes are omitted, the cost of the planted tree is usually not more than \$2.50.

Professor Chargueraud recommends that city trees should be planted in a continuous strip of soil not less than twelve feet wide and three feet deep, although he acknowledges that in Paris, in order to save expense, planting spaces are sometimes reduced to a width of nine feet. Where isolated trees are planted he recommends pits at least twelve feet square and four or five feet deep.

In Paris, in spite of all the care which is bestowed upon street-trees, the average period they remain in good condition does not exceed forty to forty-five years, so that of the hundred thousand trees which form the street plantations of the city two thousand are renewed annually, although Professor Chargueraud believes that if the best possible care is given them they can be made to continue in a healthy condition for a much longer period.

Minute directions are given in this manual for all the operations connected with the selection and care of city trees. It contains an account of the insects which are specially destructive to them and a descriptive list of the trees which have proved most useful in the streets of Paris, a second part of the work being devoted to discussing the problems relative to plantations along rural highways. The book is illustrated with three hundred and thirty-three engravings, which explain the text in an admirable manner. A large part of this volume ought to be translated and published in this country, with its illustrations, for the benefit of park commissioners, park superintendents, the mayors of cities, and other city and town officers whose duty it is to provide American streets with trees. They will find in it, we feel sure, much that is new to them; it will show them, too, that a good tree cannot be obtained without an expenditure of considerable money and without intelligence and technical training. As a people we spend millions on park roads, boulevards and parkways, doing this work as well as it is done anywhere, and then scrimp on the cost and care of the trees which are their chief ornament and alone make them desirable and valuable additions to urban equipment.

Notes.

The third part of Dr. Bretschneider's learned *Botanicon Sinicum*, published by Kelly & Walsh, of Shanghai, has appeared. It is devoted to botanical investigations into the materia medica of the ancient Chinese.

During the last fiscal year about \$130,000 worth of plants, trees and shrubs were exported from this country, while the plants, trees and vines imported as nursery stock amounted in value to \$632,500.

The mild winter and early spring in California have hurried the fruit-trees into blossom so that orchards and vineyards were considerably in advance of what they usually are at this season, when for three successive nights the mercury fell below the freezing point, an almost unparalleled temperature at this season. Of course, in certain sections this will injure the grape crop, the early cherries, peaches, prunes, apricots and other fruits, but it is hardly safe to trust the dispatches which state that half of the grape crop is ruined. It is interesting to know that fires and smudges which were kindled in many places proved an effectual protection against the frost. Here is a problem for experimenters. It would seem that the resources of modern science ought to be able to warn and protect the tillers of the soil against forces which, if unchecked, bring such overwhelming disaster.

On last Monday the choicest Hoffman strawberries, large and richly colored, cost forty cents a quart, and good fruit could be had for twenty-five cents, and even less. Handsome Acme pears of immense size are still offered in the high-class fruit stores and cost twenty-five cents each. The last specimens of Winter Nelis cost seventy-five cents to \$1.50 a dozen, and Easter Beurre command \$1.50 to \$2.00. P. Barry will follow these sorts and continue until summer pears are on the market. Besides the usual sales, these pears are in especial demand for baskets sent to voyagers leaving on ocean steamships. Almeria grapes cost seventy-five cents a pound, and well-ripened but small berried Black Hamburgs, from commercial graperies in Newport, Rhode Island, bring \$4.00 a pound. The latter have been offered in limited quantities for three weeks, but the season is later than usual on account of the dull weather of February and March. Navel oranges from California cost fifty cents to \$1.00 a dozen, and Rodi oranges, the celebrated Mediterranean summer fruit, are already here. Sapodillas, from Cuba and from Mexico, are in considerable demand, one down-town dealer having promptly sold 500 of these fruits at forty cents a dozen. Souari nuts, from Venezuela, are still occasionally seen, and cost thirty cents a dozen.

Instruction as to methods of propagating and cultivating the American Persimmon, with suggestions for its improvement, forms the subject of a bulletin just issued by the Indiana Experiment Station. Although there are many excellent varieties of this fruit growing wild, it has been much neglected. One reason for this neglect is that the fruit of some trees, even when thoroughly ripe, never loses the peculiar astringent property which the green fruit always contains. Another is that when cultivation has been attempted from seedlings or suckers the plants usually died or produced inferior fruit, or were infertile, and even if by chance a good variety was secured, a long time always elapsed before the trees came into bearing. But new methods of propagation have been introduced, so that trees can be brought into bearing in from three to five years from the bud or graft, and henceforward we may expect a reasonably rapid improvement in this fruit, not only by cross-fertilization, but by selection. We have often called attention to the fact that there are Persimmons in Japan with fruit as large as that of the market varieties grown in Florida and southern California, and which thrive at home in a climate as trying as that of New England. It certainly would seem worth while for our experiment stations to hybridize our native plants with some of the hardier strains of the Asiatic species.

In his address at the Arbor Day forestry meeting in Philadelphia, Mr. B. E. Fernow called the attention of the citizens of that city to the interesting fact that for seventy years they had been in possession of a forest reservation 13,000 acres in extent, which might furnish a field for study and practice for Philadelphians who are interested in forestry problems. The tract mentioned lies in Centre County and was given to the city of Philadelphia by Dr. Elias Boudinot, President of the First Continental Congress, as a trust fund, the income of which he directed to be applied to supply fuel to poor persons in the city of Philadelphia at cost prices. The property originally contained some of the best timber in the state of Pennsylvania, but being difficult of access and far from market it received little attention from the city authorities until early in the sixties, when a portion of the timber was cut under leases, but a much greater portion was stolen, destroyed by fire or lost through conflicting titles. Mr. George E. Kirkpatrick, Superin-

tendent of the Minor City Trusts of Philadelphia, in reply to an inquiry, has kindly furnished us with some of these facts, and he adds that the work of reforestation was begun in 1888 and has been continued to as great an extent as the limited means at the disposal of the commission will permit. The Chestnut and Oak which sprang up to take the place of the Pine and Hemlock have been retarded, of course, by frequent fires, but the land has been leased to a gunning and fishing club and the rental received assists in paying the expenses of protection against fire and trespass. The property is admirably situated for a game preserve, having a frontal of thirteen miles on the Susquehanna, being mainly rough hill land, far from settlements, containing within its limits many trout streams and naturally stocked with deer, bear and pheasants.

Asparagus is now coming from South Carolina, Maryland, Delaware and New Jersey in heavy long white stalks and the more slender green shoots, the best costing forty-five to fifty-five cents a bunch. New yellow crook-neck squashes, from Florida, cost ten cents each. Okra, from Cuba, small and fresh-looking, may be had for ten cents a dozen. French artichokes, from California and from New Orleans, are plentiful at fifteen cents each, the larger ones from France costing twenty-five cents. Showy white celery, from California, costs thirteen cents a stalk, that from Florida being a little lower in price, and now mainly sold for use in salads. The best table celery is that just beginning to come from Bermuda, and costs twenty cents a stalk. Bermuda onions are in abundant supply, 30,000 crates having been landed from the last steamer, together with 300 barrels of potatoes. The latter are becoming scarce, and command as much as \$8.00 to \$10.00 a barrel wholesale, seventy-five cents a half-peck being the retail price. Havana potatoes, at sixty cents a half-peck, are in favor, and many buyers prefer them for their mealy quality to those from Bermuda. New potatoes are also coming from Florida, the price for well-graded stock being \$6.00 to \$8.00 a barrel to wholesale dealers. Large plants of Romaine lettuce, from the south, cost twenty cents each, and tender field or corn salad fifteen cents a quart. Mint, tarragon, chervil, tansy, and waldmeister, the popular green used by Germans in making their May drink, are all seen in the retail markets. The dependence for cucumbers and tomatoes at present is on the northern hot-house product, the former costing twenty cents each, and the latter forty cents a pound. Firm white heads of Dutch cabbage and new southern cabbage cost ten to fifteen cents each. Other vegetables now noted in most collections are celeriac, salsify, kohlrabi, new turnips, leeks, peas, string beans and peppers.

A bulletin from the Oregon Experiment Station states that prunes are now the favorite orchard crop in Oregon, where the trees are sure to bear; no adverse climatic conditions need to be overcome, the finished product is not perishable, and the danger from insects and fungi are not so serious as with other fruits. The trees suffer from some pests, but these are nothing to compare with the codlin moth in the case of the Apple and Pear, and until the curculio and black-knot come from the east it can be said that the Prunes in Oregon are free from disease. The Italian Prune, also called the Fellenburg or German Prune, a dark purple fruit with a heavy bluish bloom, is the favorite in Oregon, and it is superior in quality and size and productiveness to any other Prune as grown there. It is larger when dried than the French prune, and its acid flavor is more agreeable to the taste of most people. The French or, as it is known in Oregon, the Petite Prune is a general favorite in the commercial world and among fruit growers where it thrives. As grown in Oregon it is medium-sized to small, violet-purple, with a bright bloom, sweet and rich, with a large proportion of solids and sugar, so that it shrinks less in drying than other varieties. The lack of acid, however, gives it an insipid flavor and renders it almost worthless when fresh. It does well only on light dry soil and in a warm dry climate, and these conditions are only found in Oregon in the Umpqua and Rogue River valleys. The Silver prune, a light yellow fruit and firm, juicy, sugary flesh when properly dried, is as good as any prune in size and flavor, but since the public demands that a white prune shall be sulphured the quality is somewhat injured by the process, and in some markets a prejudice is created against it. The Reine Claude will never be a great commercial fruit, but as a fancy product it is unsurpassed, being in quality equal to the best raisins or figs. A few other varieties are sparingly cultivated. Steam in pipes seems to furnish the most efficient and economical heat for drying the fruit, especially in large establishments, and those who contemplate building evaporators are advised to prepare for steam-heat.

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The Need of an Efficient Park Service.

NO matter how carefully a park may be designed or how completely it provides for the wants of all classes of the community, it must fail, of course, to serve its highest purpose unless the details of the plan are intelligently carried out. Skill in construction and maintenance is just as essential as sound common sense, creative faculty and refinement of taste in the design. In works of any magnitude it is impossible for the designer to do more than give general directions to the men in charge of the different branches of construction, and he must trust to their knowledge to interpret sympathetically the maps and drawings and other data furnished for their guidance. This is equally true as regards maintenance after the work of original construction has been accomplished. In a large system of parks like that of Boston or New York it is not possible for the superintendent to do more than pay a hurried visit to some of them once a week. A head foreman in charge of a park of considerable size can at the best spend but a small part of any day with each of the gangs of laborers under him. It is, therefore, plain that unless every foreman, besides the ability to manage men, has a thorough knowledge of every detail of the work going on under his control, there is no assurance that the park is growing along the lines marked out by its creator. Indeed, it is certain that his plan will be marred and his purpose defeated.

Of course, there must be an organized body of skilled gardeners in every park—men who know how to plant and prune, who have a knowledge of the essential laws of plant growth, who are familiar with the ways and habits of different species of trees and shrubs and herbs, so that the place that each one is to fill is understood. In some European countries it is not difficult to secure trained gardeners, but every one who has an estate to manage here knows how difficult it is to find them. It may be doubted whether any park in a city of considerable extent in the United States is adequately equipped in this line. But, besides gardening proper, there is much park work, such as repairing walks and roads, working among trees and shrubs, grading and sodding and matters of that sort, which requires a familiarity and skill in their details, and

this skill only comes from long practice under careful supervision. Efficient park officers, from the superintendent down, and an organized corps of workmen who can be trusted always to do the right thing at just the right time are plainly essential to the proper maintenance of any park which has a design to grow up to and well-considered plans for making its charms most easily available to visitors.

Let us suppose that this truth had been realized by the commissioners who controlled and managed the New York parks thirty years ago, and had been held steadily in view by their successors. They would not only have always had a competent landscape architect and a general superintendent of executive force, adequate training and experience in his profession and a sympathetic appreciation of the artistic side of the work, but by a system of selection and promotion among the subordinates they would have had at disposal a thinking machine prepared to set itself to work at any moment and ready to meet any emergency. The history of the parks here, however, and it is paralleled, no doubt, by like experience in other cities, shows that they have been under the control of an ever-changing board of commissioners, most of whom have had little intelligent interest in parks or park management. Instead of clothing the superior officers with power and then holding them responsible for their subordinates, it has been the practice of the commissioners to look with jealousy on every exercise of independent authority by these officers as a mutiny against the supreme power of the board. Until very recent times the great bulk of the force has been selected by the political chieftains in the different wards, and too often the men, as soon as they had become sufficiently experienced to be useful, have been replaced by others who had no training whatever. All these facts are so well known that they sound like a tale of little meaning, but when we think of the square miles of park property owned by this city from Pelham Bay to the Battery and realize how its possible value can be depreciated by falling into unskilled hands, the subject of securing efficient park service is certainly worth the attention of the public-spirited people of the city.

A few days ago a visitor to one of the most beautiful and picturesque of our new and undeveloped parks noticed a gang of men turned loose by the wayside and pruning shrubbery with brush hooks. Not far from this was a blazing bonfire under a group of young Hemlocks. One slight puff of wind might have carried the flames into the dry foliage, and even if the wind did not come the heat from the fire would in a few moments have destroyed a dozen trees. Fortunately, there was authority at hand to arrest the progress of the flames at once, and on inquiry it was learned that this portion of the park was in charge of a new and highly recommended foreman who, on his own responsibility, was "clearing up things" in this wild fashion. It is stated, too, on authority that in all the force there is not a sufficient number of skilled foremen to place in independent charge of the different parks to carry on the ordinary spring work which must be done every year. One result of this lack of persistent and intelligent care is that there are parts of Central Park where the plantations already seem past their prime.

May we not hope that when the long-prayed-for millennium of municipal reform arrives every member of the force of our city parks, from the executive head down, will know just what ought to be done and how to do it, and that park commissioners will allow their employees to vote as they please, but will hold each man to rigid account for the special work he is selected to do.

AFTER the almost unparalleled destruction of property and of life by forest fires in Minnesota less than two years ago it is hardly to be wondered at that the new law against these fires in that state is the most effective of all that have been enacted in the various states of the Union. But the advocates of sound forest policy in Minnesota have

not rested here, they are making a determined move toward acquiring, in the name of the state, a large area on which it is proposed to restore and preserve the forest. We have received a circular containing a synopsis of the plan proposed by Mr. Judson N. Cross, of Minneapolis, at the meeting of the Forestry Association of Minnesota, held in January of this year, and since the plan is novel and has far-reaching possibilities, all persons to whom the circular is sent are requested to express their opinions as to the details and to send any recommendations for changes, together with reasons for the same, to the Secretary of the Association, Mr. J. O. Barrett, Brown's Valley, Minnesota.

The plan is essentially this: (1) The Legislature is to constitute state, county and town boards of forestry. For the sake of economy the town board of supervisors will act as a town forestry board, the county commissioners will constitute the county forestry boards, and the state forestry board of nine members is made up of the State Land Commissioner, the Professor of Botany in the Agricultural Department of the State University, the chief officer of the Climate and Crop Service of the United States Weather Bureau in Minnesota, and one member appointed by each of the following associations, namely, the State Forestry Association, Farmers' Institute, the Board of Regents of the University, the State Lumbermen's Association, the Board of Public Health and the Fish and Game Commissioners. These are to serve without pay, except for actual expenses, and an executive committee of three is to be selected by the entire board. (2) Owners of Pine lands which have been lumbered over and other lands, especially if they are rocky, rough or sandy, and will probably not be utilized for agricultural purposes for some years, may deed that land to the state when this course is recommended by the town and county forestry boards. This land is deeded for forestry purposes only, all rights in minerals, coal, oil, etc., being reserved. Land so deeded shall be exempt from taxes, because it is dedicated to public use. (3) This land shall be called the Reserved Forest Area, and it shall be under the charge of the State Forestry Board, who is to care for it as the Legislature may direct. (4) Of the future income to be derived from such lands, one-third shall go to the state to reimburse it and the towns and counties for care and protection and loss of taxes, one-third to the person deeding the land and his heirs for a period of, say, one hundred years, after which it is to go to some institution, the other one-third to go to some designated institution or the State University. (5) The state shall have full power to lease low meadow tracts where such are needed as protection against fire, or for pasture where this will not interfere with the growth of the forest-trees. It shall have power also to sell dead and down timber, which it is supposed when the adjoining lands are settled up will bring in a large income, and generally the state is to have full power of control, even the power of alienation of certain tracts when recommended by the State Board of Forestry in such cases, for example, as where the growth of towns, the building of railroads, water-power, etc., may necessitate such alienation.

Of course, this is the merest outline of the scheme, and we have omitted many of the details given in the circular. We call attention to it, however, as a step forward, that the great prairie states, as well as New York and those in the middle Appalachian region, are taking serious thought of securing and maintaining large areas in permanent forest. Experience in Europe and in India has demonstrated that such areas owned by the commonwealth will prove a source of revenue if properly managed. Besides, they will furnish examples which private forest-owners will be eager to follow. More than all, a community which is sufficiently far-sighted to take such action will see to it that the heights and slopes which are the sources of water-supply to the valleys below are kept covered forever as the only security against those disasters which the reckless destruction of forests on highland or lowland has invariably brought.

Clematis paniculata in a Wild Garden.

SOME time ago it was suggested in these columns that *Clematis paniculata* would be an admirable plant for use where it could clamber over wayside shrubbery, after the fashion of our native *Clematis Virginiana*, which never shows to such good advantage as it does when festooning a fence stake, or brightening with its flowers the dark foliage of the *Viburnums* or *Dogwoods* which support it. No doubt, this thought was suggested by having seen the vine making itself at home in the thickets on the borders of a pond in Westbrook, the estate of W. Bayard Cutting, Esq., on the shores of the Great South Bay, Long Island. But it was the *Rhododendron* season then, and one could only imagine what it would look like in September. On page 185 of this issue, however, is a picture of a portion of the border of one of the Westbrook ponds, taken when the *Clematis* was in bloom, and it shows the great abundance of its flowers and the graceful way in which it adapts itself to the spirit of the scene. A mass of *Rhododendrons* would become tiresome if they bloomed all summer, and the snowy glitter of these *Clematis* flowers would be oppressive if they opened in spring and continued until autumn. But, after all the shrubs have done flowering, this sudden burst of bloom in early autumn is singularly effective, and the cluster of gray feathers attached to the ripened seed later on are in perfect accord with the autumn colors of the foliage which accompany them.

These shores at Westbrook furnish many suggestions for a wild garden, by which we do not mean a garden left to run wild, but one planted and tended so as to give that appearance of untamed luxuriance, of careless and unstudied grace which suggests perfect freedom. *Myricas* and Dwarf Willows, *Clethras* and *Ilexes*, *Beach Plums* and *Dogwoods* and other shrubs native here unite to form that diversity and intricacy of growth, that mystery of shadow, that air of negligence or waywardness which belongs to the wildwood and gives no hint of "dressed grounds." The coarser and more aggressive species are watched and restrained, however, from oppressing and crowding out the more fragile and delicate kinds, and the picture shows that tall reeds and grasses have been introduced, and these against a background of soft masses of Pine leaves help to complete a very perfect picture. A little way back from the pond there is a secluded walk now approaching close to the shore and again receding from it and broadening out into a space for a rustic seat, where glimpses of the water can be caught through the dense leaves. Of course, the native shrubs that have been named, with many more, naturally form the great mass of the vegetation on the shore, for the world can furnish nothing more suitable and beautiful. But this Japanese *Clematis* is only one of the exotics which help to give variety to the picture. It is proved here that many of the wild single *Roses* of other lands, like *Rosa Wichuraiana* and *R. multiflora*, are adapted to this unconventional life as thoroughly as the *Roses* of our own swamps, and yellow *Irises* from Europe seem quite as happy amid these wild surroundings as our native *Blue Flag*. All this is art, but it is the art which conceals art. To create such a scene requires patience, a knowledge of plants and the prophetic eye of taste; but, after all, studies of this sort furnish one of the most satisfying diversions for the owners of country estates. There are many other places than the borders of ponds which are adapted to wild gardens of a type similar to the one figured here, but water, still or flowing, gives a distinct advantage in many ways, especially in the light and openness it secures and in the reflected pictures, broken or perfect, which it adds to the scene.

The Tannins of the Palmettos.

IN the many accounts of the uses to which the southern Palmettos are applied the reader is frequently left in ignorance as to whether the Scrub Palm, *Serenoa serrulata*,

or the Cabbage Palm, *S. Palmetto*, is intended. For information concerning the former, the papers by Dr. J. B. Read (*American Journal of Pharmacy*, 1879, page 169) and by Rusby, Bastedo and Coblentz (*Alumni Journal of the College of Pharmacy of New York*, 1895, page 169) may be consulted.

The Cabbage Palm has not been written about so much, nevertheless it is used extensively in a variety of ways; the Cabbage is a valuable article of food, and the wood is employed in constructing wharves and other works where a wood is needed to withstand the attacks of the teredo. Both Palms are used in the manufacture of brushes, brooms, etc., in which their fibre is available. One of the exhibits in the Agricultural Building of the recent Cotton States Exposition at Atlanta was composed entirely of products manufactured from the two Palmettos.

The reports which have circulated in regard to the tanning value of the Palmetto have, no doubt, always referred to the Scrub Palm, and excellent leather has been and is made from it. A recent sample yielded the following percentages on analysis:

	Moisture.	Ash in absolutely dry material.	Tannin in absolutely dry material.
Stem, above ground,	8.56	5.68	5.48
Root,	7.46	4.43	7.58

The stem examined was from above ground, and the root was a section of that part proper, and not of the underground stem.

The tannin is associated in the plant with a large proportion of red coloring matter, which has a tendency to make a dark leather. When finally separated the pure tannin gave reactions with iron salts and with bromine water, which indicated its close relationship with that from Oak bark. An ultimate analysis confirmed this by yielding the following percentages:

Carbon,	61.22
Hydrogen,	4.85
Oxygen,	33.93
	100.00

Something over a year ago a tanning extract made from the Scrub Palm appeared in the northern markets under the name of "syrup of tannin," but, as it contained a considerable quantity of the red coloring and not over seven per cent. of tannin, it did not find purchasers. Dr. Charles Mohr is authority for the statement that this extract industry has been abandoned. If a high-grade extract were offered at a reasonable price, there is no doubt but tanners could be found who would use it.

The question has often arisen about the tanning value of the Cabbage Palm, and recently, through the courtesy of Dr. J. H. Mellichamp, of Bluffton, South Carolina, two specimens have been received and examined. One was a section from a medium-sized tree five feet from the ground, and the other a section of the same tree a few inches below the sheaths of the living leaves near the top. On analysis they yielded the following percentages:

	Moisture.	Ash in absolutely dry material.	Tannin in absolutely dry material.
Section near ground,	10.04	7.80	1.79
" " top,	8.35	3.78	1.54

The section near the top, being more porous, dried out more rapidly in transit, and, therefore, yielded less moisture. The tannin percentages indicate that this species is not likely to ever have any value as a tanning agent. Some of the cortex was separated from the lower section, and it was found to contain just about the same percentage of tannin as the whole section.

The credit has frequently been given to tannin for enabling the wood of this Palm to withstand the attacks of the teredo when placed under water, but it is evident, from the foregoing figures, that this property must be attributed to something else.

College of Pharmacy, Philadelphia, Pa.

Henry Trimble.

Foreign Correspondence.

London Letter.

FLORA OF SOUTH AFRICA.—Botanists and horticulturists interested in south African plants will be gratified to know that the *Systematic Flora* of that region, commenced in 1860 by Harvey and Sonder, but completed only as far as the order Campanulaceæ, is being carried to a conclusion at Kew under the direction of Mr. Thiselton Dyer. Part 1 of vol. vi. has just been published. Price, seven shillings and sixpence. The volume, of which this is the first installment, will be of more than ordinary interest, as it will include the whole of the plants familiarly known as "Cape Bulbs," which have been popular in gardens for a century or more. We owe to south Africa more beautiful garden bulbous plants than to all the rest of the world put together. Thus of Iridææ alone, of which there are between 700 and 800 species, about one-half of them are natives of south Africa. These occupy over 160 pages of the publication under notice, which has been entirely elaborated by Mr. J. G. Baker, who has long been the accepted authority on this and allied orders. Among the larger genera included are *Gladiolus*, 81 species; *Moræa*, 45; *Babiana*, 26; *Tritonia*, 32; *Ixia*, 23; *Lapeyrousia*, 24; *Watsonia*, 15. The descriptions are in English. The work is published by L. Reeve & Co., under the authority of the Governments of the Cape and Natal.

THE JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY for March contains several papers of exceptional interest. Mr. Francis Darwin has a paper on "Etiolation as a Phenomenon of Adaptation," in which the occurrence of white or bleached leaves or flowers in various plants is commented upon. Mr. Freeman-Mitford's valuable paper on hardy Bamboos will serve as a guide to the cultivation and an authority upon the nomenclature of these plants to those who do not possess his beautifully illustrated book upon them. Mr. A. W. Sutton contributes an account of the Potato from its introduction to its present development. His grafting experiments with the Potato and Tomato go to show that neither stock nor scion was affected by the union. Mr. Sutton is in a position to speak with authority upon the best varieties of the Potato as grown here now. Dr. Masters' paper on substitutes for Larch, which in the British islands is too often ruined by fungoid diseases, will be useful to foresters. The results of various trials at Chiswick among vegetables and flowers are given in better style in this number than before.

APPLES AND PEARS.—It is difficult for the would-be planter of only good sorts to make a selection from the hundreds that are grown and catalogued by dealers in fruit-trees. With a view to the formation of a definite list of the best varieties the Royal Horticultural Society offer this year special prizes for the best-flavored apples and pears. Six fruits of each variety must be shown, the judges to cut any three of them. The fruits must be grown out-of-doors and the place, conditions as to soil, etc., stated. If grafted the name of the stock must be given. The judges will allot points to quality, appearance and size as well as to flavor. Enormous specimens will not be preferred, as beyond a certain point size becomes a defect. A prize of ten shillings will be awarded to each apple. By this means it is hoped that an authoritative list of apples and pears of first-rate quality will be obtained. At present we are too much at the mercy of the dealer who supplies sorts which are said to be excellent, but which are too often worthless. Of course, the conditions under which the tree is grown are an important factor. I have in my garden trees that are generally admitted to be good, but which have never yet borne good fruit. [This subject was discussed on p. 161 of this volume.—ED.]

STREPTOCARPI.—The success of Messrs. Veitch & Sons in crossing and improving these plants has been marked, and this year they have some striking new seedlings. The monophyllous species, such as *Streptocarpus Dunnii* and *S.*

Wendlandii, are remarkable for their numerous flowers and bright colors, but they are unpopular with cultivators because of their ungainly leaves. The hybrids between these and the multi-leaved species, such as *S. Rexii* and *S. Galpini*, have several leaves, but they also are more or less one-sided. Three years ago Kew introduced a species with numerous large leaves and many-flowered scapes, known as *S. Fanninii*. This was crossed with other sorts, and from the hybrids thus obtained Messrs. Veitch have bred some most promising seedlings. It is impossible to say how far breeders may go with these plants. Already we have great variety of color, size and quantity of bloom, but it is evident that there are still better results within reach. The plants are very easily managed; they may be had in flower at any time of year, and their flowers are useful in various ways. Messrs. Veitch grow them by thousands planted out in frames facing south and heated to the temperature of an ordinary greenhouse. In the spring they are lifted and potted up to flower.

HIPPEASTRUMS.—These plants continue to occupy the attention of skillful cultivators and breeders, but I question if much improvement has been made in them in recent years. Certain changes in form, size or color blending have been made, but the flowers are often what may be justly termed inartistic, notwithstanding the satisfaction of the breeder when he produces a flower with broader segments or more fantastic colors. It is easy to carry these so-called improvements too far, as witness the dumpiness and total lack of elegance in the Chinese Primrose and *Cineraria* as now admired by fanciers. The *Camellia* was spoilt in the same way, so that we have gone back to the once despised singles and semidoubles. In my opinion, *Hippeastrums* may be too large in flower, and they may also be too formal in shape. I have lately seen new varieties valued at ten and even twenty guineas, which, although perhaps coming nearest the ideal of the florist, were less pleasing to the layman than varieties valued at as many shillings. Color improvement is after all the principal desideratum in the *Hippeastrum*; its original form is good enough. Several amateurs are now working with a view to better color, among them being the Right Honorable Joseph Chamberlain, M.P.

CALADIUMS.—These plants have grown in popularity in recent years. This is, no doubt, due to the improved varieties raised, chiefly, I believe, in France and Belgium, and also to their being wonderfully well grown by the two nursery firms which make a specialty of them, namely, Messrs. J. Laing & Sons, Forest Hill, and Messrs. J. Veitch & Sons, Chelsea. I saw a large houseful of them in the latter place a few days ago. The plants were in twelve-inch pots and were simply great globose masses of large, richly colored leaves of the most varied hues. Among the best of them were some new seedlings raised by the late Mr. C. F. Bause, one of the most skillful of breeders in England. These seedlings are remarkable for brilliancy of color and dwarfness of habit. They are named *Her Majesty*, *Lady Mosley*, *L. Bause*, *Sir Henry Irving*, etc. There are eleven of them altogether, and I see they are offered by Messrs. Veitch at prices varying from half a guinea to a guinea. Is it generally known that *Caladiums* are excellent plants for the tropical aquarium? Planted in a bed of mud, or in pots partially submerged in a tank of warm water they grow vigorously and color superbly.

DAFFODILS are now by far the most popular of all spring-flowering bulbous plants. Our public gardens are painted yellow with them, lawns as well as flower-beds being decorated with their flowers. New sorts are appearing almost weekly, and several specialists are devoting their gardens wholly to the cross-breeding of Daffodils. A conference and exhibition of Daffodils was held this week in the gardens of the Royal Botanic Society, Regents Park. Mr. Baker, F.R.S., presided, and addresses were given or papers read by such well-known authorities as Mr. F. W. Burbidge, M.A., Mr. W. Robinson and the Rev. S. Bourne. Magnificent collections of the flowers came from Messrs.

P. Barr & Sons, the leading growers of Daffodils among nurserymen, Mr. T. Ware, Messrs. J. Veitch & Sons, and numerous amateur growers. Cups and medals were awarded for new varieties. Mr. Baker, in opening the conference, spoke of the enormous increase in the popularity of the Daffodil within the last twenty years, due, no doubt, largely to the fact that it was a democratic flower, responding to the attention of growers of the most limited means and yielding freely its flowers, which in form and color were artistic and pleasing. The reign of the Daffodil is assured.

London.

W. Watson.

Plant Notes.

ACER CISSIFOLIUM.—This Japanese *Negundo* has been fruiting in this country for many years, and we have invited attention to it in every volume of *GARDEN AND FOREST*, and yet in half a dozen catalogues of the leading nurseries of the country, which we have just examined, we do not find it offered for sale. We may add that the same is true of other trees and shrubs whose merits have been proved long ago in the Arnold Arboretum and made known again and again in these columns. This Box Elder is beautiful at all seasons, and being somewhat formal in habit and comparatively small, it is one of the limited number of desirable trees for planting as single specimens on a lawn. It is a compact round-headed tree with a gray trunk, slender, light green leaves in summer, which turn to brilliant orange and red late in autumn. The young shoots have a habit of growing and producing new leaves all summer, or, at least, long after other trees have finished their yearly growth; and these young leaves at the extremity of the branches, showing the delicate shades of red and pink which characterize spring foliage, give a peculiar sprightliness to the general expression of the tree. It grows rapidly and is more hardy than the Japanese Maples, which are varieties of *Acer Japonicum* and *A. palmatum*.

ANDROMEDA JAPONICA.—Recent English horticultural papers speak of the beauty of this shrub as exhibited at the spring flower shows, and a correspondent of *The Garden* writes of great masses of it in flower at the Knap Hill Nurseries of Mr. Anthony Waterer and of a fine group of it by the Palm-house lake at Kew. In vol. vi. of *GARDEN AND FOREST*, page 254, Professor Sargent writes that the plant is a tree in its native home, where he had seen specimens thirty feet high with stout well-formed trunks six or eight feet in length. In our north-eastern states it grows rather more freely and has a more graceful habit than our native *Andromeda floribunda*, which is closely related to it, and when at its best, with its broad, drooping panicles of large white bell-shaped flowers, it is one of the most interesting of evergreen shrubs. It cannot be trusted to bloom, however, in our climate, although it is perfectly hardy, for the flowers open so early that they are almost certain to be killed by cold weather. Farther south, where it would flower in February, it would certainly be a most desirable shrub.

ROSA LAWRENCEANA.—The Fairy Rose, as this plant is appropriately called, is uncommon in cultivation, and Herr Leichtlin has but recently distributed it among plant fanciers. It is a double form of the white-flowered *Rosa Indica minima*, and while it may, perhaps, not prove perfectly hardy in this latitude, it is well worth cultivation by those who fancy dainty rather than big flowers. The plants make many-branched bushes, with very small leaves and dainty little pure white flowers less than an inch in diameter when expanded.

Cultural Department.

Vegetable Garden Notes.

THE month of April, 1896, must go on record as one of the most remarkable ever experienced for sudden changes of temperature. Until the 10th instant we were unable, owing to cold weather, to do any outdoor work, such as seed-sowing. A week of phenomenal heat followed, when the thermometer



Fig. 30.—*Clematis paniculata* in a Wild Garden, at Westbrook, Long Island.—See page 182.

recorded ninety degrees in the shade on one occasion and on several days reached eighty or eighty-five degrees. Such forcing weather brought things forward with a rush, and although Peas, Onions and similar crops were sown from ten days to a fortnight later than in 1895, they are at this time more forward than they were a year ago. Now we are having a cold dry spell, with frost almost nightly, and vegetation is making slow progress. A more perfect season for seed-sowing could not be desired. There have been but two showers so far during this month. With warmer nights and more moisture crops will make rapid growth. The tropical weather in the middle of the month tempted many to plant large patches of Sweet Corn and Beans in this locality. Each year some of these crops are sown at this time, and they are always cut to the ground by frost by the middle of May. Last year there was a killing frost on May 17th, when all tender crops were destroyed. In this part of New England it is not really safe to plant out such vegetables, as Tomatoes, Peppers and Egg-plants, before May 20th. We prefer to have good stocky plants in cold frames until that date, and there we feel they are safe, whereas by planting out a week earlier there is uncertainty about their safety whenever the night turns chilly and the weather-vane points north or north-east.

Our early sowings of Peas have recently been earthed up a little and pea-brush placed among them; the ground will require frequent stirring with the hoe or cultivator to loosen the surface and keep down weeds. An iron rake drawn over the ground between rows of seeds when they first appear will stir the ground nicely and destroy multitudes of almost invisible weeds. Occasional sowings of such kinds as Stratagem, Heroine, Champion of England and Shropshire Hero have recently been made, the seed of these being covered more deeply than at our earliest sowing. Peas do much better sown while the ground is comparatively cool, as they naturally prefer a cool and moist climate. Later batches sown after hot dry weather sets in never give such good returns as those planted earlier. For sowings made after this time we choose our moistest ground, and it is helpful to mulch between the rows with grass or meadow hay. Mulching serves a twofold purpose in keeping the ground moist and cool. Where seaweed is obtainable it is one of the best things to use for this purpose, and it is also excellent for protecting Celery kept in trenches during the winter. A friend sent us on April 15th some fine heads of Boston Market Celery grown on Cape Cod and preserved in this way.

We find it risky to sow any Sweet Corn or String Beans before May 10th. Sowings made much earlier have come through all right, but the later-sown ones give better returns. Our earliest batch of String Beans in frames is now showing flower. A later sowing made in sashes from which Violets were taken are in second leaf. The sashes are thrown off these during the daytime, but it will be necessary to cover them at night for some time. Our earliest batch of forcing Erfurt Cauliflower is now giving some nice heads for cutting. These and, indeed, all vegetables in frames require plenty of water and stimulants. The ground will require occasional stirring among Lettuce, Carrot, Beet and other crops in frames, and weeds must be allowed no foothold. Artificial pollination will make early Cucumber set better and swell faster. We make our first sowing of these and of Melons in the open about May 6th, scooping out a hollow space for the seeds, which we cover with a sixteen by twenty-four sheet of glass. This is kept on until the plants are well established, ventilation and water being afforded as required. To those who do not possess hand sashes or other protecting appliances this will be found a cheap and useful method, and the plants do decidedly better than if started in pots or turf in heat and then transplanted.

Onions raised in boxes have recently been planted out in rows eighteen inches apart, allowing six to eight inches between the plants, according to the variety. Onions do so much better pricked out that we purpose relying on this method exclusively in future. Not one-fourth of the seed necessary to sow the rows is required, and, although a little time is needed to set out the plants, it is more than counterbalanced by that saved in thinning and weeding those treated in the regulation way. Some persons object to large-sized onions, and where this is the case it is best to stick to the old method. Onions like the ground pretty well primed, but on no account should it be allowed to become baked. The hoe must be kept constantly used in the cultivation of these and all other vegetable crops at this season, before weeds make any headway.

Our first batch of Celery was pricked off into boxes some time ago, and is now ready to transfer to a frame, from whence it will be planted in the open about the end of May. We have

recently made a sowing of Boston Market, Giant Pascal and Kalamazoo for a winter crop. The ground now occupied by early Peas will be utilized for this Celery later in the season. A sowing of Golden Self-blanching Celery made now will give some fine heads in the fall. This variety rusts very badly during hot weather if not kept well watered. Sown now it will give good solid heads until Christmas. This is a suitable time to make sowings of Sweet and Pot Herbs, Brussels Sprouts, Savoy and Drumhead Cabbage, Leeks and Okra. Martynia we sow about the end of May. Successional sowings of Beet, Lettuce, Radish and Turnip may be made, and if Parsley has been forgotten in the spring rush, a row of it may be sown now.

Tomatoes for the earliest outdoor crop have just been shifted into six inch pots, and fruit will be set on these before they are planted outside, insuring an early crop. The plants for the main crop are now in boxes in a frame. It is better to thin or pot off the plants if they get crowded and are in danger of becoming spindling. Short stiff plants are best. A long lanky plant which needs a stake to support it before it is many inches high cannot be expected to give satisfactory returns. Plants now fruiting indoors require at this season an abundance of water, and we give liquid stimulants three-times a week, in addition to scattering a handful of sheep-manure on the top of each pot once a week. The plants require looking over at least once in ten days, when superfluous growths, decaying foliage and necessary tying can be attended to. Our latest batch indoors has recently been placed in fruiting-pots, and fruit is just commencing to set on these. These plants, with others still bearing heavy crops, will furnish us with plenty of tomatoes until the middle of July, after which an outdoor supply can be relied upon until the middle of October.

Taunton, Mass.

W. N. Craig.

Seasonable Work.

THE removal of many bedding plants to outdoor frames at this season relieves the overcrowded condition of the greenhouse, and affords the opportunity to harden off the plants before placing them in the open ground. The various cool-house plants grown for this purpose, for example, Geraniums, Verbenas, Ageratums, Alyssum, Sedums, Phlox Drummondii and many others of like hardiness, will be in better condition if placed out in a frame before this time, and from May 1st more tender plants may also be put in similar quarters. These will naturally require more care in ventilation for the first few days, so that they may not receive any check.

This partial clearance of the greenhouse will make it possible to shift on and spread various summer-blooming plants required for the conservatory next season. Among plants deserving special attention in this particular none are more prominent than the tuberous Begonias and Gloxinias, for while tuberous Begonias are valuable as bedding plants in some favored sections in this country, in the main they are more satisfactory for indoor decoration. Considerable space and light are needed for their full development, although some protection from full sunlight is also necessary when they are grown under glass. The young plants should be potted on before they become badly starved, for once stunted they seldom fully recover. The large-flowered garden varieties of the tuberous Begonias are not the only ones of value to the private grower, and well-grown specimens of Begonia Boliviensis, B. Chelsonii, B. Weltoniensis and B. Froebeli add much to the beauty and interest of a collection. The latter species is particularly striking, with its bold foliage and strong spikes of brilliant red flowers. Most of the Gloxinias should now be ready for their final shift to the pots in which they are to bloom, six-inch pots being generally large enough for this purpose. About the time these plants show bloom they will be benefited by an occasional watering with weak liquid-manure. Gesneraceous plants in general are shade lovers, and Gloxinias are no exception to the rule. In watering, the foliage should not be wet to any great extent, or the leaves become rusty.

Various relatives of the Gloxinias also demand attention at this season, among others Achimenes and Tydæa, both genera including many beautiful forms well adapted for conservatory decoration during the summer months. Large baskets filled with Achimenes would be a revelation of beauty to those not familiar with them, and they are not really difficult to cultivate. Thrifty young plants should be used for this purpose, and should be planted all around a wire basket of large mesh, the basket being lined with moss to retain the soil. Thorough watering is required by the Achimenes while in growth, and the basket should be hung in a partially shaded location and not exposed to strong draughts.

Cyclamens for next winter will also require attention now, and these plants should never be starved while young. Comparatively few growers save the old corms from one season to the next unless it be those of some particularly fine form, young plants being easier to manage and usually more satisfactory. Rather open soil and good drainage are essentials in the cultivation of Cyclamens, and perfectly clean pots should be used for them. Watering should be done carefully. Frequent light syringing is helpful during hot weather, but this should not be done late in the afternoon, as the foliage should be kept moderately dry at night. Plenty of fresh air and some shading are also necessary, and a sprinkling of chopped tobacco-stems spread among the pots will tend to discourage aphids and thrips.

Holmesburg, Pa.

W. H. Taplin.

Spring-flowering Plants.

THE recent exceptionally warm weather has brought into bloom most of the early spring flowers with magical rapidity, and in a week the face of nature was transformed from winter sere to the bloom and beauty of spring. Fortunately, cooler days have followed without frosts to injure this growth, and there is promise of a favorable spring season. The past winter was exceptionally fatal as to plant-life, and many of the shrubs considered hardy have been injured sadly. *Magnolia Soulangeana* has all flower-buds killed, and many other of the smaller plants of various *Magnolias* have been severely killed back. I observed to-day the first flowers open on the plant of *M. Kobus* (Thurberii). This plant is quite an old one, and was presented to Dr. Thurber when it was named, but it has not bloomed till now. It is not one of the showiest species, but is a vigorous grower of compact habit and of brightest green in summer. The newer *M. Watsoni* has been killed to the ground. The plants were small, but were well established last year, and, indeed, it bore flowers last spring that were much admired, and it was considered a genuine acquisition to the list of garden shrubs. It may possibly prove hardy if protected in a sheltered position, and it would be of interest to learn how it has behaved in other localities.

Pæonia corallina and *P. Wittmanniana* are two of the rarer species of *Pæony* not often seen in cultivation, and belong to the very early-flowering type of which *P. tenuifolia* is the best-known representative. Neither of the first named has flowered here before, owing, as we thought, to tenderness of the early shoots; but the buds were to be seen, but they did not develop properly, but it would seem now that the failure was due to lack of flowering strength, for, now that the clumps are well established, they are both about to flower. Several species of *Pæony* are great additions to gardens when they are obtainable, but, for some reason, we do not often see them in lists, probably owing to the greater demand for the showy garden forms of *P. herbacea*, but those that flower so early in the year have a value of their own. The flower-buds of these are now showing color, while those of the garden forms are scarcely to be seen above ground.

In years past we have noted the beauty of *Puschkinia Libanotica*, and each year it is among the very first to open its blossoms in the outdoor garden, defying frost and snows, and only waiting for a few bright days to expand its pretty flowers. It is very similar to a *Scilla*, and might be easily taken for one, but the bells are of a very pale blue, almost white, with a distinct dark blue stripe down each division of the bell-shaped perianth. Here it is not only hardy, but seeds freely each year, and from a half dozen bulbs first planted we have now as many as fifty large and small. The seeds seem to grow freely where they fall, for they have never been collected or sown in the regular way, but with the non-disturbance of the soil by digging or otherwise we have quite a little colony of this pretty spring flower.

I think, also, that for the past three or four years the pretty *Fritillaria aurea* has been noted for its good ways, and the temptation is strong to speak of it again now; it is the only one of the *Fritillaries* that I know that will thrive in the outdoor garden in this latitude. *F. Meleagris* will exist for years, but not so as to give any pleasure to its possessor, and the *Crown Imperials* are very uncertain in their habits, but *F. aurea* has been perfectly happy here for the past three years. The color of the flowers is a bright yellow outside, checkered with black squares within in a very pretty fashion. It is also very easy to increase from the number of young bulbs formed round the older ones. The western *F. pudica* is also one of the prettiest of the native *Fritillaries*, but is too tender for this section to do well; it is a modest little flower with a charm all its own, but is best grown in pots indoors in winter.

There has always lingered a suspicion as to the absolute hardiness of the *Eremurus* in an open, much exposed loca-

tion, and until last fall we have always given it a protection of straw, but by accident this was omitted last November, and many were the doubts as to the result. When spring came we had deep frost without snow for protection, and many things suffered in consequence, but not so the *Eremuri*, for they are coming up stronger than ever and seem to have enjoyed the cold on the whole. The two species we have are *E. robustus* and *E. Himalayacus*, but soon we hope to try more of them, the difficulty being to get them in good strong roots of the rarer kinds, the demand being apparently greater than the supply. There need be no more doubt as to the hardiness of these fine border plants.

A plant long known in gardens as *Amaryllis Hallii* here in New England proves to be *Lycoris squamigera*, and under the latter name has been recently made plentiful by importers of bulbs from the east. As *A. Hallii* it has been cultivated in a garden at New Bedford for many years, and was possibly brought there by some of the trading ships that used to start from that port, and as a hardy bulbous plant it has great merit. It is the only really hardy member of the genus that we can cultivate here, and there was a doubt as to whether the bulbs recently obtained were identical with the older ones long known here. I am glad to see that they have come through the winter without any harm, with no protection whatever, and are growing freely, though not large enough to bloom this season; there appears to be no doubt that we can depend on the two being identical and within easy reach of cultivators.

South Lancaster, Mass.

E. O. Orpet.

[*Lycoris squamigera* was originally brought from China by Dr. George R. Hall, of Bristol, Long Island, and was distributed as *Amaryllis Hallii* by the Messrs. Hovey, of Boston. The plant was described and figured in GARDEN AND FOREST, vol. iii., p. 176.—Ed.]

Flower Garden Notes.

AZALEAS which have been forced for Easter decorations should now have all weak shoots and premature growth which usually accompanies the blooms cut out. The whole plant should be evened over, and, if trained, tied into shape. If grown continuously in pots this is a good time to repot them. Azaleas, however, are slow-growing plants; they do not need shifting often, and generally, if some of the old soil is taken away and some fresh added, the plants will continue in good condition for two or three years, and old plants often for a longer time. They must be repotted when thoroughly pot-bound; and in such cases it is advisable to chip away a quantity of the old soil, leaving a rough surface about the ball of earth so that it will easily compact with new soil. As close a shift as possible is sufficient, so long as the new soil can be worked in firmly between the pot and the ball. It is better, however, where it is possible to devote a properly prepared piece of garden soil, to plant them out for the summer. They do not need less care; they simply do better when the conditions of success are understood. A rather tenacious loam is best, in which abundance of well-decayed leaf-soil is well composted. The ball of earth should be stirred as recommended for potting, and the new soil worked in about them quite firmly, scarcely more than covering the top of the ball. A basin should be left in which water will collect.

Astilbe Japonica and the newer *Spiræa astilboides* and their varieties, now out of bloom, may be cut up and planted out. With two years' growth these will be ready to force again. If this practice is followed there should be no need of importing roots for forcing, since as good clumps can be grown here as in Europe.

The practice of growing *Deutzia gracilis* in pots is a good one. They can be grown several years by shifting on from small pots to ten-inch size. Beyond this size they become unserviceable, when they can be turned into the shrubbery. By striking a few cuttings of green shoots taken at this time it is quite easy to keep up a succession.

Erica Caffra, var. *densa*, and *E. melanthera*, two easily forced Heaths, may be trimmed into shape and turned out for the summer. Heaths are usually recommended for shaded places, but we have found these do quite well in the full sun, providing they are plentifully supplied with water.

Cytisus racemosus is now extensively used for spring decorations. The long stems, clothed with graceful racemes of fragrant yellow pea-like flowers, are effective among foliage plants. The *Cytisus* is easily grown and bears hard treatment. Such as have been in bloom may be cut back and turned out, providing they have balls of earth, but young plants struck this winter are better if kept in pots. Shifted along from three

to six inch pots they grow into a convenient size for almost any kind of decorative work. To some of the plants we allow only one stem, and these make a perfect column two feet high. Others are stopped and grow mostly into pyramidal form, and some into compact bushes. Old bushes soon get leggy and out of shape. *C. elegans*, the silver-leaved kind, is by far the handsomest. It is generally found difficult to root. By stump-ing an old plant in and taking stem cuttings with a heel we have never had any difficulty in rooting it.

A few small plants of *Rhodotypus kerrioides* have been blooming in a cold frame since the first of April. No doubt, this handsome Japanese shrub would be well adapted for forcing in the same way as *Deutzias*, and would be a valuable addition to the limited number of shrubs available for this purpose; so also will the Crimson Rambler Rose. All who saw the specimen exhibited by Mr. Jackson Dawson, of the Arnold Arboretum, at the spring show of the Massachusetts Horticultural Society were delighted with it.

Old stools of Japanese *Anemones* in pots are starting in cold frames. Last spring they were repotted, and we intend to carry them through this season with a top-dressing of rich soil and liquid-manure later. We shall keep them in cold frames until all danger of frost is past, as experience has shown that they easily become blighted by even light spring frosts. Such disfigurement will last a whole season.

Violets and Carnations will be planted out as soon as the work can be reached. Such frost as there shall yet be will not injure them. Of Violets we shall grow only the Farquhar for dark blue. This Violet will entirely supersede the Marie Louise. It is superior in size of bloom and length of stem, and in color it is equal. So far as tested it has proved easy to manage.

The bulk of stock used for winter blooming in the greenhouse can be planted out for the summer. In this respect we have the advantage of the English gardener, who must grow many of these plants in pots under glass. *Mignonette*, *Sweet Alyssum* and *Shirley Poppies* will be sown, and *Stocks*, *Asters*, *Coreopsis Drummondii*, *Scabious*, *Phlox cuspidata*, *Verbenas*, *Marigolds*, *Zinnias* and other useful annuals for cutting will be planted out as soon as settled weather comes. These we keep together. Last year we found *Caryopteris mastacanthus* valuable for cutting in the autumn, as well as being a useful plot-plant. The graceful sprays of sweet-scented lavender-blue flowers are very effective.

Wellesley, Mass.

T. D. Hatfield.

***Helleborus orientalis*.**—Besides the Christmas Rose, the genus *Helleborus* contains several very showy and attractive species, known in England under the name of Lenten Roses, because they flower during the Lenten season. With us they are somewhat later unless grown in a cool frame, when they may be had in great profusion at Easter. The species most beautiful as well as most varied is the not uncommon *Helleborus orientalis*, which grows somewhat taller than the Christmas Rose, producing more slender and leafy stems, each bearing several large rose-colored flowers. As in the case of all *Hellebores*, the sepals form the showy part of the flower; they are from three-quarters of an inch to an inch long, rounded and spreading, of a dull rosy color, persistent, and gradually becoming green. The leaves are evergreen, smaller, and with more narrow segments than those of the Christmas Rose; pedate, with about nine oblong-lanceolate segments, which are coarsely toothed or serrated. There are some beautiful varieties, merely differing in size and color, such as *Guttatus*, with large white flowers, the sepals of which are dotted all over with small rose-purple spots; *Punctatus*, with smaller and more numerous dots; *Antiquorum*, almost pure white, slightly tinged with red and greenish gray. As all the *Hellebores* are woodland flowers, delighting in moist vegetable soil, in rocky woods, where the air is continually cool and moist, they should be treated accordingly. The leaves are best preserved in somewhat shady positions, but the plants flower more abundantly in moderately sunny places, if not too dry. Rocky borders of small streams, under deciduous trees, offer many opportunities for growing these charming plants successfully in ideal positions.

***Anemone ranunculoides*.**—One of the most common, as well as most attractive, spring flowers of northern Europe is the Golden Windflower, *Anemone ranunculoides*, which flowers considerably later than the common white Windflower, among which it grows. It is seldom, if ever, found in low, flat woods, preferring steep hillsides, where it grows in rich leaf-soil in comparatively deep shade. The leaves are smoother, less cut than those of *A. nemorosa*, palmately three or five parted, with deeply toothed almost trifid segments. The stem-leaves,

forming the involucre, are tripartite, petiolate, shiny green. The flowers, which, in favorable positions, measure nearly an inch across, are bright golden-yellow, from one to three on a stem. The plant grows from five to eight inches high; the creeping rhizome is rather thick and fleshy, producing several leaves. I have never seen this handsome species in American gardens, but it would, however, prove a very charming acquisition, providing its naturalization is possible.

Newark, N. J.

N. J. R.

***Pitcairnia*.**—This genus includes many handsome plants, and although they are easy to grow and have large showy flowers and bracts, specimens are rarely seen outside of a botanic garden. The genus belongs to the Pineapple family and is nearly related to the *Tillandsias*. While they come from tropical America they are grown here in a temperature ranging from fifty to fifty-five at night, along with *Billbergias*, *Echmeas* and *Tillandsias*. They do best in a position where they have plenty of light, and in bright weather require frequent syringing. The compost for potting them should consist of fibrous loam, chopped fern-root, leaf-mold and sand in equal parts. It is important to have the pots clean and well drained, as the plants need plenty of water while they are growing. For the past three or four weeks a large plant of *Pitcairnia Altensteinii* has been attractive and much admired. The plant has a very short stem, but it has graceful leaves which measure three feet and a half in length and about two and a half inches in breadth. The inflorescence is a simple subspicate raceme, and the peduncle measures two feet in length. The bright red bracts on the peduncles are about two inches in length, and long after the flowers are gone they retain their clear color. Indeed, the bracts are more showy than the flowers. The corolla is long and narrow, measuring about three inches, and of a whitish color. This showy *Pitcairnia* was introduced from western Venezuela in 1840. It is sometimes found under the generic name *Puya* and also as *Pitcairnia undulatifolia*.

Botanic Garden, Harvard University.

R. Cameron.

Correspondence.

Potato Blight.

To the Editor of GARDEN AND FOREST:

Sir,—I have just read with interest Bulletin 113 of the Cornell Experiment Station. This bulletin treats of Potato diseases, and among others describes and figures the "early blight" as it occurs at Ithaca. My interest in this topic was increased by the fact that I have now in press a bulletin on Potato blights, the publication of which has been delayed some time awaiting engravings. Among these illustrations which are to appear in our bulletin is one agreeing essentially in the diseased characters of the leaf with the beautifully colored plate which Mr. Lodeman has labeled "Early Blight." The conditions represented in our leaf (and they are unquestionably the same in the leaf figured in the Cornell bulletin) are, however, distinctly different from the "Macrosporium blight," or "early blight," as that disease has been described in various parts of America, France, New Zealand and Germany. It will only add more confusion to a subject already sadly confused if we do not sharply distinguish the two disorders. To this in my lectures before students and farmers' institutes during the past winter I have used the name "Tip-burn" of the potato, to designate this latter trouble as distinguished from the true "early blight" or *Macrosporium* "spot disease." In fact, we must distinguish at least four, and, perhaps, five, distinct forms of the so-called "blighting" of Potato leaves, which commonly occur in the north-eastern United States. So far we have names for but two. Of these the "late" or *Phytophthora* blight is now quite generally recognized and distinguished. Beyond this all is confusion, since the term "early blight," as popularly used, has been broadened to cover all forms of premature dying Potato leaves from causes other than attacks of the fungus *Phytophthora infestans*. I was thoroughly impressed with this fact during a trip made to Wisconsin last August, in which I had opportunity to examine blighting Potatoes at various points along the way. Upon my return I wrote to each of the experiment stations in north-eastern United States asking for specimens of Potato leaves showing the *Macrosporium* or "early blight" as it occurred in that locality. The material thus collected, together with a considerable amount collected in other ways during the past four years, has been carefully studied by my assistant, Mr. Tracy, and myself. The diseased conditions represented clearly fall into several classes as to cause. These are:

First: The "late blight" or mildew caused by the fungus *Phytophthora infestans*.

Second: The "early blight," *Macrosporium* disease, or "leaf spot" disease, due to the parasitic attacks of the fungus *Macrosporium Solani*, E. & M. This is characterized by the appearance of numerous sharply defined dark spots scattered irregularly over the leaf. These spots, enlarging slowly, dry, and the tissue is by this drying thrown into irregularly concentric elevated rings. The character of these rings is peculiar, and forms a valuable method for hasty identification of the disease as it usually occurs. These spots may or may not originate from flea-beetle punctures. It is agreed by all investigators that this fungus most readily attacks plants or leaves that have passed their period of greatest vigor. It is, as Dr. Sorauer says, one of the "Schwächeparasiten," but, nevertheless, a most destructive parasite when well established in a field.

Third: "Tip-burn," a disease characterized by the drying of the leaves at the tips and margins, not necessarily associated with any fungus attacks, but attributable to physiological conditions surrounding the plant, especially to dry hot weather with insufficient water-supply, and aggravated by insect attacks or any other conditions which lessen the vigor of the plants. This is clearly the trouble figured in the Cornell bulletin as "early blight." Mr. Lodeman's account of the physiological conditions leading to this disease is excellent and in accord with my own observations, but, as already indicated, we must clearly distinguish this third disease from the second, both as to cause and appearance. Of course, various fungi and bacteria capable of existing as saprophytes soon invade the tissue which has died from "tip-burn," and these soon complicate and often aggravate the disease. As shown in the material examined, the nature and extent of these secondary fungus invasions varies considerably in different localities according to conditions. These invading fungi are exceedingly interesting, and have received considerable study; a discussion of them would, however, be out of place in the present summary.

Fourth: "Arsenical poisoning" from Paris green or other arsenites applied as insecticides. In case of extremely strong application of these arsenites the leaf may be entirely killed or large areas "burned" within a short time. Usually, however, its action is slower and longer-continued. Its effects are then apparent as dead spots centering about flea-beetle punctures or other mutilations in the leaf. These spots continue slowly to enlarge for some time, and, as a result of the slow death and drying of the tissues, the surface of each is thrown up into distinctly concentric elevations or ridges forming "ringed spots" so similar to those caused by the attacks of *Macrosporium Solani* that they are extremely deceptive. There is, however, a distinctly different color to the spot, as a rule, and the rings are more regularly circular in the poisoned spots. These arsenical poisonings are of very common occurrence, and are unquestionably responsible for much of the confusion regarding "early blight."

Fifth: Dead spots sometimes occur on the margins of leaves or surrounding flea-beetle punctures or other injuries which are not invaded by fungi, and do not seem attributable to arsenical poisoning. They develop the characteristic rings, and resemble spots caused by the *Macrosporium* or the arsenical poisoning, but are often, at least, due to dry heat, as suggested by Dr. W. C. Sturges in the Report of the Connecticut Experiment Station for 1894. In this case they should be associated as to cause with "tip-burn" rather than with "early blight."

Experiment Station, Burlington, Vt.

L. R. Jones.

Recent Publications.

Nut-culture in the United States. United States Department of Agriculture. 1896.

Six years ago Professor H. E. Van Deman, who was at that time Pomologist of the Department of Agriculture, sent out circulars of inquiry to all parts of the United States where there have been any systematic efforts at planting nut-bearing trees for the production of their fruit. Wild nuts have always been so abundant in this country that there has been little need of cultivating the native sorts. Our native pecans, shellbarks, walnuts and chestnuts vary widely in size and quality, but it has been the popular belief that a long time would be required to raise the improved varieties in any quantity, since propagation is slow and grafting in many instances difficult.

Nevertheless, there have been many individual instances where success has been won with improved kinds of our native Chestnuts and the foreign sorts, with the English or Persian Walnut, with the Almond and the Pecan, and there have been hopeful experiments with the Shellbark Hickory and in the extreme south with the Cocoonut. A very good account of what has been really accomplished will be found in this book, which is a compilation of the answers to the replies made to Professor Van Deman's circular, and published by the Department of Agriculture. The text makes about one hundred quarto pages, to which are added sixteen full-page plates, some of them colored, and there is a carefully prepared index. The cultivation of the Almond is already established in southern California, and seedlings of excellent quality are constantly produced, and it seems to have become a matter of common observation that the best variety in any locality is some seedling which originated there. The cultivation of the Persian Walnut, too, has become well established in southern California and the exports are increasing annually. Perhaps the largest cultivated Walnut grove in the world is one in California, which contains seven hundred acres. The account of hybrids between different species of Walnut from eastern Asia with the California Walnut, our Black Walnut and the Persian or English Walnut suggests the possibility of producing trees of widely varying form and habit, although no distinct improvement in the fruit has yet been accomplished.

Perhaps the most interesting chapter in the book is that on the Hickory, especially the section which relates to the Pecan, a tree which equals in importance, if it does not surpass, the Persian Walnut and the Almond. This tree will thrive over a large area and the fruit varies very considerably, so that by selection it is possible to get large, thin-shelled, delicately flavored nuts. Large orchards are being planted, and in many cases trees which bear inferior nuts in the forests are cut out so as to leave room for those which bear better ones. A grove of this sort—that is, a grove made by thinning out a forest of 450 acres on the Guadalupe River, in Texas—has produced \$2,000 worth of nuts in a year. One of the plates represents a wild Pecan-tree which had been top-budded four years earlier with five choice varieties, and it already shows a vigorous head of young shoots bearing nuts. If this method is practicable with large trees it will not be difficult to utilize the abundant wild trees of the south for the production of choice nuts. A good account of the experiments with Shellbarks is also given, and the story of the improved varieties of Chestnuts, with which the readers of this journal are familiar, is told at length. It seems probable, too, that from Delaware southward the English Hazelnut can be successfully grown, and there are some of our native Hazels in the north which bear nuts as large as imported filberts, with thin shells and altogether of superior quality. Many of the species of Pine on the Pacific slope, including Arizona, have seeds that the Indians use as food, and they are marketed in large quantities in some of the cities of California. One of the plates of this book is devoted to the seeds of these Pines, twelve different sorts being figured. Some of them are large, soft-shelled, of a delicious flavor, so that they are valued both for dessert and confectionery purposes wherever they can be had. These nuts are generally harvested by the Indians, who heat the cones until they rattle out, having been roasted in the process. Whether any of these species will reward the planter if brought into cultivation is a matter of the merest conjecture.

Little needs to be said of the miscellaneous nuts, native and imported, several of which are grown in a small way in different parts of the country. The general subject, however, is most interesting, and this bulletin is valuable for bringing together in a condensed form about all that is known of it at the present time. The truth is, that the sum total of our knowledge is now very slight indeed. Few fields offer greater attractions to the workers in our experi-

ment stations than this, and the time ought not to be far distant when nut-trees can be propagated with the same ease and rapidity as our ordinary orchard fruits.

Notes.

Egyptian onions are already seen in the wholesale markets, the first shipment of 250 crates having arrived a few days ago. The Havana product is about out of market, but nearly 30,000 crates came from Bermuda last week.

Pineapples, from Cuba, continue to come in limited quantities, about 5,000 barrels having reached this port during last week. The extremely high prices commanded by the earliest receipts of small lots of this fruit are broken in view of larger supplies. From eight to eighteen cents apiece is now the rate by the hundred. The first cargo shipments are expected by the middle of May, when the Bahamas will also contribute to the supply.

New potatoes are now coming from California, Louisiana, Florida, Cuba and Bermuda, and prices at wholesale range from \$6.00 to \$10.00 a barrel. The highest grade of sweet potatoes, from Vineland, costs \$5.00 in barrel lots. During last week 16,072 barrels of domestic potatoes were brought into this city, and since October 1st 1,091,516 barrels have been sold here, besides 5,986 sacks from Europe and 11,805 barrels from Bermuda.

The apple export season is now nearly ended, 154 barrels having been shipped from New York last week, while 267,319 barrels were forwarded to Europe from this port since September 1st. For home supply 4,622 barrels were received here during the six days ending with last Saturday, and since September 1st, 687,212 barrels. Choice Ben Davis apples now cost the retail buyer \$5.50 a barrel, Baldwins \$4.50, Roxbury Russets \$4.00, and Golden Russets \$3.50.

More than two hundred tons of cut Narcissus flowers are sent every year from the Scilly Islands to England. In addition to these, the bulbs raised here, which have excellent free-flowering qualities, constitute an important branch of trade. Mr. F. W. Burbidge states that in the crowded manufacturing centres of England these flowers and bulbs are as cheap as they are beautiful, and are largely bought by artisans, so that flower-farming in the Scilly Islands, at least, is not a business which depends for support on the luxurious rich, but one which brings freshness and beauty into the homes of the people.

The Spinach Leaf Miner is a small white maggot which tunnels through the leaves of Spinach, Beet and Pigweed, and it has been multiplying with such rapidity in the market-garden district of Long Island that the cultivation of Spinach will have to be abandoned unless it can be controlled. There seems to be no period of the year during which insecticides can be applied with success, and the only feasible plan of controlling it is to destroy all the Pigweed and plow old Spinach fields late in the fall and early in the spring. A bulletin has just been issued from the Geneva Experiment Station on the subject in which the insect is fully described and figured.

We have received a copy of the *American Florist Company's Directory*, a list of the florists, nurserymen and seedsmen in the United States and Canada, to which is added a list of the park superintendents and directors of botanical gardens and cemeteries. Besides this there is a comprehensive catalogue of the Chrysanthemums, Cannas, Roses and Carnations which have been introduced into cultivation in this country, together with the names of the introducers, the date of introduction and a brief description of each plant. A list of the officers of the most important horticultural societies in the country, with a brief history of other important associations in some way connected with the nursery, flower and seed trade, complete this compact and highly useful volume.

A bulletin of the Maine Experiment Station makes the following record of some of the comparatively new varieties of wrinkled Peas as tested last year. Station (Gregory), moderately vigorous grower, five to six peas in a pod, quality good, edible in from forty-five to fifty-five days from planting; Morning Star (Childs), growth rather less vigorous, five or six peas in a pod, quality excellent, edible in from forty-five to fifty-five days; Exonian (Thorburn & Co.), vines of medium height, but very slender, foliage noticeably light-colored, six peas to the pod, edible in from fifty to sixty days; Early Woodside (Smith), rather dwarf, six peas to the pod, quality good, edible in from sixty to seventy days; Echo (Burpee), moderately vigorous, seven peas to the pod, edible in from sixty-five to seventy-five

days; Nott's Excelsior (Maule), dwarf habit, about a foot high, five or six peas to the pod, maturing in from fifty to fifty-five days, an excellent pea.

The March issue of the *Bulletin de la Société Centrale Forestière de Belgique* contains an interesting note on a plantation of White Pine (*Pinus Strobus*) about two and a half acres in area, situated near the railway station of Gedinne, in the province of Namur. The trees, which have been planted twenty-five years, have already been thinned three times since 1888, the thinnings having been sold for six hundred francs, or in round numbers \$125. Two thousand two hundred trees are now standing, and their measurement shows that the plantation contains three hundred and fifty-four cubic metres of timber, equal to an annual growth of more than fourteen cubic metres over the whole area. It is stated that the White Pine is distinguished in Belgium by its rapid growth and hardiness, resisting the severest cold and the effects of late spring frosts, and growing, when mixed with other trees, more rapidly than any of its associates.

The eighth report of the Mississippi Experiment Station gives the results of a series of experiments with grasses and forage plants which have been conducted there now for eight years past for the purpose of ascertaining what plants will restore fertility to the soil most rapidly while giving fair returns in hay or pasture, which ones will make the best permanent meadow, which ones are most suitable for permanent pasture, especially for winter grazing, and which hay-producing plants are of the best temporary use. Five hundred and eighty-six species have been tested on different varieties of soil, the seeds having been sown under different conditions in all parts of the state. When this work was begun it is said that no hay was grown in Mississippi except that used for home consumption, and thousands of tons were brought into the state every year. The average yield per acre has since then been more than doubled, and in 1895 it was eighty-four per cent. above the average yield of the whole United States and 114 per cent. in excess of the average yield in the northern and central states of the Mississippi valley.

In the last number of *The Country Gentleman*, Mr. S. D. Willard, of Geneva, states that the extreme cold weather of January has proved very disastrous to the orchards in the great fruit region of western New York. Of Plums, the French Damson, which is grown in a limited way, is the only variety which is likely to give any crop at all. Such entire failure has never been known since the growing of plums became a recognized industry in this section, and it proves that the fruit cannot endure a temperature of twenty-two degrees below zero. The extremely dry autumn which left no moisture in the soil to supply the demands of evaporation may have aided in the injury, and yet the trees held their leaves very well and developed a good stand of fruit-buds and were in apparently good condition to withstand such winters as are usually experienced. With the exception of Hill's Chili, few varieties of Peach-trees show a single live bud. Sour Cherries will set an average crop, while of the sweet varieties Elkhorn and Windsor are in much the best condition. This last is a comparatively new variety which originated in Windsor, Ontario, and was disseminated by Ellwanger & Barry. It is of fine quality and beautiful appearance and its hardiness will give it additional value.

Andrew S. Fuller, widely known as a writer on subjects related to agriculture and horticulture, died suddenly of heart failure on Monday at his home in Ridgewood, New Jersey, in the sixty-eighth year of his age. Mr. Fuller was agricultural editor of the *New York Weekly Sun* for more than a quarter of a century, and at different times he had been connected with *The Rural New-Yorker*, *The Tribune*, *The Agriculturist* and *American Gardening*. He was the author of several popular books on arboriculture, small-fruit culture and the propagation of plants, and he had recently completed a treatise on nut-culture, which he considered his most important work. He was an authority in some branches of entomology, an enthusiastic student and experimenter in his chosen field, and was absorbed in his favorite occupations until the very hour of his death. He had gathered about him at Ridgewood a choice collection of trees, shrubs and herbaceous plants, which he grew with rare skill and distributed with unfailing liberality. His orchard of nut-bearing trees was especially interesting, and it is sad to think that the world will lose the benefit of Mr. Fuller's trained habits of observation as he watched the behavior of the numerous varieties he was testing and reported on the value of different modes of treating them.

As soon as it was resolved to protect the forest properties of the state and exploit them under direct Government supervision, a few officers were appointed with a staff of subordinates. These officers were generally selected from the military or medical staff, perhaps because they had some knowledge of botany or were considered specially fit for some other reason. A knowledge of technical forestry was not insisted upon then, and Mr. Brandis was the first to bring such knowledge to bear on the question. As soon as he was appointed Inspector-General he saw the need of technically trained assistants, and he at once took steps to organize a technical department, and brought over two trained German forest officers in 1866—Messrs. Schlich and Ribbentrop—both of whom have been his successors in office, and at the same time he made arrangements for the professional education of young Englishmen in France and Germany. Before these trained officers were available the staff was augmented by the appointment of young officers in India, who began their service in lower grades, and were promoted as they learned by experience. Later on, however, and especially since the establishment of the forest school at Cooper's Hill, every addition to the force has been a trained forester, except on one occasion, when a large number of officers were suddenly needed to take charge of new forests. The number of officers in the controlling grades now amount to two hundred, and they have the prospect of regular promotion and pension. In 1878 a forest school was also established in one of the north-western provinces at Dehra Dun, in which the education was at first superficial, but since 1887 it takes rank with the best institutions for educating a subordinate staff in any country of the world. The support of this school and the rest of the forest establishment costs four millions of rupees a year, and this expenditure must soon be largely increased, as the subordinate staff is now too small to keep pace with the ever-increasing work. On the other hand, the revenue has more than kept pace with the growth of the expenditure. The net average surplus for five successive five-year periods, beginning with 1867-8 and ending with 1891-2, is as follows: (1) 1,339,000 rupees; (2) 2,129,000 rupees; (3)

2,689,000 rupees; (4) 3,848,000 rupees; (5) 6,186,000 rupees; the cash surplus for the year 1891-2 being about seven and a half million rupees, with a tendency to grow, in the face of constantly increased expenditures for fire protection, constitution of reserves, amelioration of forest estates, surveys, working-plans, road-building and the like. In addition to this annually increasing direct income, the Government forests have yielded immense quantities of products to right-holders and other privileged persons. The annual value of this outside yield represents, at least, as much as the entire amount spent on the whole forest establishment. Besides this, the value of a well-ordered forest area to the country which lies below it can never be estimated. It is an interesting fact, however, that in one district in the Punjab, lying at the foot of a small mountain range, comprised of friable sandstone, the Government suffered an annual loss from land revenues alone amounting to 90,000 rupees a year, owing to the devastation of the fields which followed the destruction of the forests over a comparatively small mountain area. Losses like this are reduced every year since forest destruction has been arrested. Besides this, the forest improves steadily and the increase of its capital value is enormous, although it can be hardly expressed in figures. The sum of the matter is that, although in India ten million rupees are spent every year in administering the state forests, a liberal and growing surplus is realized from the annual growth of the produce, and besides this, large amounts are harvested by right-holders, the agricultural and climatic conditions of the country are substantially benefited, while the forest is not infringed upon either in area or immature stock, but is steadily growing in productive capacity.

We are certainly justified in taking heart and hope at what has been accomplished in India during thirty years, for there is no reason to doubt that the same thing can be done in America, where the Government still holds possession of large timber areas. President Gibbs, of the National Academy of Science, in his reply to the request of the Hon. Hoke Smith, Secretary of the Interior, who had asked that body to undertake an investigation of the subject of forestry in this country, has stated the points to be considered by the Commission as follows:

(1) The question of the ultimate ownership of the forests now belonging to the Government—that is, what portions of the forest on the public domain shall be allowed to pass either in part or entirely from Government control into private hands?

(2) How shall the Government forests be administered so that the inhabitants of the adjacent regions may draw their necessary forest supplies from them without affecting their permanency?

(3) What provision is possible and necessary to secure for the Government a continuous, intelligent and honest management of the forests of the public domain, including those in the reservations already made or which may be made in the future?

Most of these questions have received an actual and practical answer in the management of the Indian forests. It is admitted that the social conditions of the two countries are entirely different; but so are the climatic conditions of India and Europe, and yet Sir Dietrich Brandis and his successors have proved that the laws of forest growth are the same the world over, so that forests in India can be made to grow in productiveness and in value by adopting the same principles upon which the successful forestry of Europe has been founded. In the same way the broad principles of law upon which this forest policy has been built do not differ in different lands. Here, too, there must be a trained corps of foresters. Here, too, the Government, the only permanent possessor of the soil, must manage its own forests if there is to be any stable policy. Here, too, there must be an adjustment between local needs and the rights of the commonwealth. If once public opinion is educated up to adopting and enforcing such legislation as may be recommended by experts of recognized ability, we shall soon have legislation looking toward the selection of suitable tracts for conservative

forest treatment. If the Government will hold, protect and manage these national forests, disposing only of their annual increase, the time is not far distant when there will be a paying demand for these products, and when private forest owners will realize that it is to their interest to follow the example of the Government and place their forest property under similar control.

The Flora of the California Coast Range.—I.

THE Coast Range is the general name for the great mountain system which stretches along the coast from southern California to Puget Sound. It is not a continuous range, but a broken mass of parallel ridges from forty to seventy miles wide, with many other chains transverse to the general trend of the range, and enclosing numerous valleys, large and small, of widely different altitudes. Great streams rising in the Sierra cut through it here and there, while other streams rising in the range itself pour directly into the Pacific at various angles, and through the depressions where they flow fogs and wind pour in to modify greatly the local climates. At some points broad plains or low rolling hills lie next to the coast, and at others high mountains along the ocean shut out the wind and fog from the country behind them. San Francisco Bay exercises a marked influence on the climate of a large area, and all these factors tend to produce diversity of temperature and moisture in an apparently capricious way in places near together; in fact, no two places have the same climate and rainfall. In the Sierra Nevada the frostless belt lies at a certain altitude; in the Coast Range there is no warm belt, but isolated warm spots which depend on altitude, prevailing wind, fog and exposure. The result is that the climates here can only be ascertained by experience.

The rainfall is even more capricious than the temperature. In every rain there is a considerable difference in the precipitation between Ukiah and the Insane Asylum, three miles away across an open valley, being invariably less at the latter place. Little Lake, twenty miles from here, has a greater rainfall. Mendocino City, on the coast, has an annual rainfall of more than fifty inches, while seventy miles away, Colusa County, in the Sacramento Valley, has eight inches, and at points in Shasta County, at the head of the Sacramento Valley, the rainfall has been as great as 120 inches. The geological formation of the ranges and the character of soils constantly vary, and in the rougher sections they vary widely at very short intervals. Under such conditions the flora of the Coast Range cannot be other than interesting, and it is hardly probable that there is a more captivating field for the botanist in the world. Plants are much localized, and frequently found there out of their usual range. To the enthusiast in natural science the study of these endless variations and their causes is a source of constant pleasure.

Nowhere in the range is there greater variety than in the area comprised within Mendocino and Lake counties. Here we have a narrow table, or hill-slope, next the ocean originally covered with *Pinus muricata*, sand dunes and salt lagoons. A few miles back high table-lands lie between the deep-cut river channels, covered with a tangle of low shrubbery. Up the river cañons on the ocean side, and fringing the valleys, the great coniferous forest begins, and after a few miles the Redwood begins and stretches to the tops of the range which, at twenty miles from the sea, forms a barrier 2,000 feet high between the coast and the interior. This barrier range, diversified by masses of Douglas Spruce, Oak woods, thickets of Chemisal or mixed shrubs, open grassy slopes, tiny mountain meadows or wide enclosed valleys, and with small patches of Redwood in cañons or cool slopes on its landward side, is a most interesting field for the botanist. Midway of Mendocino County a prominent ridge crosses the mountain range, towering up from five thousand to six thousand feet above its lofty neighbors, snow-capped until summer, its lower slopes covered with forests of Yellow

Pine or Sugar Pine. This is the San Hedrin Mountain, while farther east Mount Hull, Snow Mountain and Mount St. John are higher still, each having a geology and flora peculiarly its own. Rising at the base of this range Eel River flows north-west to the ocean, while near by the Russian River flows to the south. The banks of the first are rugged and rich with conifers, while the basin of the latter is the home of a large and varied family of Oaks. East of the Russian River valley is another great barrier range, smooth and round topped, its higher slopes a vast even growth of brush, its lower slopes grassy and dotted with Oak woods, and its cañons treasure-houses to the lovers of trees and flowers. High on these shrub-covered mountains are little vales which are also mines for the flower lover.

Beyond these lies Clear Lake, thirty-five miles long, surrounded by high mountains, and although 1,300 feet above the level of the sea, it furnishes congenial homes for Orange groves. Further to the east another lofty Pine-covered range divides Clear Lake from the headwaters of the Sacramento and offers a region, half-alpine, rough and hard, yet of surpassing interest. I have been collecting in this wonderfully diversified region for sixteen years, and yet there are numberless fields that I have not explored, and every year I am reminded how little I really know of them. I shall try to convey some faint idea of the characteristic trees and flowers of some of these sections, always keeping in mind that twenty others such belts might be cut from the Coast Range, each quite as interesting to the naturalist and without any danger of monotony, while the whole series terminates at the north in that wild Olympic range between Puget Sound and the ocean, one of the most striking and least-known of our nation's possessions.

Ukiah, Calif.

Carl Purdy.

A Botanical Journey in Texas.—IV.

LEAVING Marfa very early the thirteenth day of June, we arrived in the afternoon of the same day at El Paso, one of the best-known cities of Texas, situated at the extreme western limit of the state. The city contains about twelve thousand inhabitants. It is the capital of a county of the same name, which covers eight thousand four hundred and sixty square miles. El Paso is near the one hundred and sixth meridian, near the thirty-second parallel, and the average annual rainfall for the last nine years is about ten and one-half inches.

Across the river, and nearly opposite El Paso, is the Mexican city, Ciudad Juarez, the two cities standing near the head of the "Pass," a nearly level valley extending many miles down the river, and probably an earlier lake-like expansion of it. Centuries ago the beauty of the Pass, and its adaptability to irrigated agriculture, led to the establishment of a Spanish colony and mission at Juarez, which is one of the oldest cities of America, and Baron Humboldt, who visited this locality early in our century, speaks in praise of the Pass, of the Mission, of the vineyards there and of the Mission grape.

The vicinity of El Paso is one of the principal seats in Texas of successful agriculture by irrigation. At the river rapids, about a mile above the city, low dams have been built letting the water of the river into the main ditches on each side of it for distribution to the fields of grain, vegetables and fruit. At this immediate point most of the farming is done on the Mexican side of the river. But on the American side, farther down the river, and near Ysleta, fields of Wheat, Barley, Corn and other grains are common. Alfalfa, the great forage plant of irrigated lands, is the commonest farm crop. Its growth on such fields is wonderful, three or four cuttings of it being made in a season. At Juarez are venerable Pear-trees, two or more feet in diameter, larger Apricot trees than I had seen before, vineyards, Apple orchards, and occasionally a Quince-tree, and this where cultivated trees, as well as cultivated smaller plants, live only by irrigation.

While in Mexico I visited the extensive orchards and vineyards of Dr. Alexander, a sturdy hospitable German of the old school, who bought his grange of a son of the priest who entertained Baron Humboldt in his home at the time of his visit to the Pass. The vineyards of Dr. Alexander contain about thirty thousand vines of the Mission Grape, which was probably introduced into this country by the Spaniards. Little is known of its origin or of its introduction to America. The fruit when ripe is dark purple in color, of fair size, well clustered and full of thick sweet juice, fermenting into a rich strong wine. Its leaves in general outline resemble those of the southern Muscadine, but they are larger and more deeply lobed, the larger leaves sometimes approaching in form those of our common Ampelopsis. The trunk readily takes a tree form and requires no trellis. The vine has simply adapted itself to the climatic conditions of the country to which it has been transferred, since no poles for trellising grow here. The grapes begin to ripen early in the month of August. September is the wine-making month. It is said that the wine would be better if the grapes remained on the vines until November. But for obvious reasons it is necessary to gather them much sooner.

On an average each vine yields an annual crop of ten pounds of grapes. The pure juice of fourteen pounds of grapes will afford a gallon of ripe wine. A glass of this wine kindly proffered by Dr. Alexander, although but ten years old, was well matured for its age, healthful, full of good cheer, and vivacious. Long experience has led my host to conclude that the Mission Grape is the only variety that is well adapted to the conditions of climate and soil which exist in the El Paso region, and that will afford at the least cost of production a good potable wine.

In the streets, yards and parks of El Paso I saw growing western Cottonwood, Silver Poplar, Lombardy Poplar, Willow Catalpa in handsome tree form, Barbadoes Flower Fence, or, as some people call it, Bird of Paradise Tree (*Cæsalpinia pulcherrima*); Jerusalem Thorn, Yellow Locust (*Robinia*), Silk Tree (*Albizia*), Mexican Elder (*Sambucus*), China Tree (*Melia*), Paradise Tree (*Ailanthus*), Wild China (*Sapindus*), Osage Orange (*Ioxylon*), English Ivy (*Hedera*), Virginia Creeper (*Ampelopsis*), Red Mulberry, *Morus*, and others. There are thousands of acres of land in this great valley now vacant, but capable, under irrigation, of becoming highly productive. Nature is doing all that is in her power to assist in redeeming and fitting the alkaline flats for agriculture. She is employing several *Hoffmannseggias*, some *Daleas*, a half-dozen species of *Atriplex*, three or four *Amaranths*, a species of *Lepidium*, *Suædas*, *Bigelovias*, *Helianthi*, *Sesuvium*, *Trianthema*, coarse Grasses and Sedges and other plant laborers, to change and purify the soil by their living, and by their death and decay to add to its permanent fertility. The refuse-matter of the streets and stables should be utilized for the same purpose, and then the only great need would be a permanent supply of water for irrigation.

As it is now, irrigation at El Paso is far in advance of actual agriculture. Probably three times the amount of farm and garden products might be raised with little additional expense for water. But the river-bed itself is sometimes as dry and dusty as the unsprinkled streets of the city. Irrigation is yet in its infancy. A dam sufficiently strong to hold the accumulated floods of the Rio Grande and of other large rivers would involve an expense of millions of dollars and heavy damages for overflows, and could exist here only by international agreement. In time such structures might be worth far more than the cost of building them.

The general features of the flora around El Paso are somewhat peculiar. Species of the Pea family have decreased, while species of the much smaller Malva family have increased in numbers. Species of *Compositæ*, especially shrubby species, are very numerous. *Cruciferae* hold their ground, species of *Lesquerella* being unusually abundant. Certainly two, perhaps three, species of *Agave* rep-

resent the Amaryllids. A *Dasyllirion*, several *Yuccas* and a few smaller species of other genera stand for the Lily family. *Amaranths* and *Chenopods* give character to the vegetation of the alkaline flats, while species of *Prosopis*, a *Baccharis* and "Cachamilla" Arrow-wood, *Pluchea borealis*, not a very good *Pluchea*, though as well in that genus as anywhere, attend them.

Wislizenia refracta, of the Caper family, was met here for the first time, and in the prime of its flowering. It is a plant of queer habit and of queer ways; sometimes spreading, it is usually erect and two to four feet tall. It bears its flowers in long terminal racemes. In fruiting the peduncles bend backward; hence the significance of the specific name of our plant.

Biscutella Wislizeni, a rather handsome Crucifer, grows in the damp sands of the "draws" of the mesas and in the mountain dells. This species, too, wears a peculiar habit which makes its recognition easy. It bears its rather large white flowers in pairs. They are succeeded by rounded pods, so as to appear, as its generic name signifies, like two little shields. It is the "Spectacled Plant" of Dr. Havard's catalogue of the plants of southern and western Texas.

Martynia althæfolia is common in fertile places. This species produces rather large flowers, which are purplish on the outer and yellow-spotted on the inner side. The plant sometimes spreads over a square yard of ground. *Atriplex canescens*, which is common from the lower Rio Grande far northward, has not missed this locality. Several other species of that genus have settled here. *A. elegans* appears to be the beauty and the pet of the genus as seen around El Paso.

Helianthus ciliaris, the odd one of our species of that genus, is one of the chief groups of plant-workers that Nature is employing to remove alkali from the low bottoms of the river. It is a low-growing species, and it is kept too busily at work to enable it to take the time to make its flowers large and gaudy, nor is it able to hold its head as high or to dress in the style of its taller and more aristocratic relatives of the species of *Helianthus*.

This entire region abounds in rare and peculiar forms of plant-life. A botanist could well employ a year's time in the county of El Paso. I know of no other short ramble that a botanist or a tourist could take and see so much of living nature that should interest and instruct him as a half-day's walk from El Paso up the Santa Fé Railway by old Fort Bliss to the smelter and back along the other railway to the city, especially if the walker on his return leave the railway when about a half-mile from the city, taking the wagon-road over the hills. He could see *Acacias*, the curious *Screw-bean*, *Arrow-wood*, *Cassias*, *Willow Catalpa*, *Hymenoclea*, *Wislizenia*, *Biscutella*, *Daleas*, *Lepidium*, *Tribulus grandiflora*, *Martynia*, *Riddellia*, *Baileya*, *Janusia*, many handsome and strange Grasses, and many more extreme western Texas and Mexican species.

La Junta, Colo.

E. N. Plank.

Plant Notes.

Magnolia stellata.

THE flowers of all our native *Magnolias* open after the leaves expand, and some of the Asiatic *Magnolias*, like the beautiful *M. hypoleuca*, belong to the same class. But there is another well-known group of species and hybrids which form their flower-buds completely during the summer, and these open early in the spring before the leaves appear, when their abundant large flowers always make them objects of popular interest. The best known of these is the Yulan *Magnolia*, *M. conspicua*, a large shrub, or often a symmetrical tree, twenty-five or thirty feet high, which bears large lily-like, pure white flowers. *M. Soulangeana* has the same habit as *M. conspicua*, but smaller white flowers, streaked with purple at the base, which open a few days later. This is a hybrid between *M. conspicua* and *M. obovata*, a large shrub, with flowers cream-white within and deep purple on the outside. In

its original form the latter plant is comparatively rare. *M. Lenné*, a widely spreading bush, somewhat resembles it, and it may be a hybrid between *M. obovata* and *M. conspicua*.

Magnolia stellata, which was introduced from Japan nearly thirty years ago by Dr. Hall, after whom it is often called *M. Halliana*, is now becoming quite common, and its general form is well shown in the illustration on page 195, although, for some reason, the flowers were not as abundant this year as usual. This specimen stands on the grounds of the late Mr. Francis Jenkins, of Jersey City Heights, and was planted some twenty-five years ago. It is twelve feet high and has a diameter equal to its height. The flowers usually appear a week before those of the Yulan *Magnolia*, although at the right of the illustration there can be seen a portion of a plant of *M. conspicua*, which the warm weather this year hurried into bloom with *M. stellata*. The flowers of this species are pure white, three or four inches in diameter, and they have not the somewhat disagreeable odor of the other early-flowering species, but are delicately fragrant. The petals are narrow, and they spread out into a star shape, which justifies the specific name. The plant has good foliage and is interesting at all seasons. Besides its other good qualities it is perfectly hardy; it begins to flower when it is hardly two feet high, and it will flourish in any ordinary garden soil. Like all other *Magnolias*, *M. stellata* should be transplanted in spring after the growth has started. If the fresh roots are bruised earlier than this they are liable to decay, but the wounds will heal over readily when the vital forces of the tree are active.

Cultural Department.

Culture of the Garden Bean.

IF we study the characteristics and growing habits of both the dwarf and tall-growing or pole garden Beans, we shall find that while they are rapid growers and good feeders, with a root-system which can collect food from a drier and coarser soil than most garden plants will thrive in, they are not able to profit much from fresh and "unmatured" fertilizers, and will do best on soils which have been made rich by dressings applied during preceding years rather than the current one; also, that of the three elements of plant-food, nitrogen, phosphoric acid and potash, it is the last two which the Bean plant seems to find it most difficult to collect in sufficient quantities, so that application of these two elements, in such form and so mixed with the soil that the roots can readily take them in, is most likely to increase the yield and improve the quality of this crop. We shall also find that the plants are very susceptible to injury from an oversupply of water, particularly at the root, and a well-drained soil is essential to even a fair growth. Lastly, while the plants seem vigorous and are rapid growers under favorable conditions, there are few of our garden plants which are so easily discouraged and succumb so quickly to unfavorable conditions, or to any injury, particularly if it be to the root. The plant seems to lack recuperative power, and a mutilation of the root, which would be little more than a stimulant to Corn, Cabbage or Lettuce, will stunt or even kill a Bean plant.

If we keep in mind these characteristics of the plant we will be able to cultivate it more intelligently and with greater success. We should plant our Beans in the driest and warmest part of our garden. As early as possible in the spring the Bean plat should be thoroughly spaded and firmed to the full depth of fertile soil; and unless it is already very rich, we should apply (after the spading) a liberal dressing of well-rotted manure, or a dressing of from four to twelve pounds of fine ground bone, and one peck to one bushel of wood ashes to the square rod. Care should be taken to spread the fertilizer evenly, and to work it well into the surface soil. A week or ten days later work the ground over again and repeat this deep and thorough cultivation every week or ten days until after the seed is planted and the first true leaves have appeared. After this the soil should be stirred or tramped on as little as possible, though any starting weeds should be destroyed by raking or shallow hoeing which merely cuts the surface. The secret of a good bean crop, either in the garden or field, as far as cultivation is concerned,

is to put the soil into the finest possible tilth before the seed is planted, thus avoiding the injury to the plant which would inevitably result from stirring the soil after it is filled with roots. The labor spent in preparing the soil for the crop is

and early sorts, like the Mohawk and Black-eyed Wax, quite early, but the bulk of the crop should not be put in until the ground is warm and settled warm and dry weather may be expected. Just after the fall of the early apple-blossoms is



Fig. 31.—*Magnolia stellata* in a New Jersey Garden.—See page 194.

not wasted, for if it is well done there will be no need of later cultivation, and surely it is easier and cheaper to do all necessary cultivation before planting than after.

In garden culture it may be well to plant a few of the hardier

usually the best time to plant Beans. As the seed is usually of good vitality and so large as to be little liable to loss we should use only a few more seeds than we expect plants. A poor yield and a poorer quality is often the outcome of overseeding

and consequent crowding. If the dwarf sorts are planted in drills a plant once in four to eight inches, or two once in about sixteen inches, are enough, and more than three to five plants should never be left in a hill. It is well to sow somewhat thicker than this and thin out as needed when the plants have formed the first true leaves.

The tall-growing varieties need some support, and we have found that they "take to" an inclined much better than to a vertical pole, hence our plan is as follows: We plant the seed in hills twenty to thirty inches apart in rows running north and south, and drive a six to eight foot pole slanting at an angle of about twenty-three degrees to the north; on the south side of each hill we saw off the tops to a line and connect them with cords. The plants will climb these poles much better than if vertical, and the pods hanging free are more easily gathered, while the vines festooned over the cords at the top are very beautiful. As soon as the plants are well up all necessary thinning, and in case of the tall varieties poling, should be done, and the ground be deeply and thoroughly cultivated; after which care should be taken not to compact it by tramping any more than absolutely necessary. In clean ground most of the weeds will have been started and killed by the early cultivation, but if any appear they should be destroyed while small by raking or hoeing.

Detroit, Mich.

Will W. Tracy.

Flowers of the Season.

IT might be added to the recent note on *Tulipa sylvestris* that this is an excellent species to naturalize in the grass or wild places, owing not only to its vigor, but also to its peculiar root-action, which conducts the young bulbs away from the flowering place of the parent. Owing to this habit this Tulip spreads satisfactorily and continues in vigorous condition since it occupies new ground. Of course, it is necessary to plant in good open soil. Good forms of *T. sylvestris* are of a rich deep yellow, very fragrant and of a charming habit, the stems being slightly pendulous at first and only carrying the flower perfectly upright as it matures. *T. sylvestris* seems to be widely distributed, and it varies very much in size, though the smaller varieties may enlarge under good treatment. The best form in my garden is an Italian one from Dammann. The flowers are not much pointed and have green markings on the outer petals; they are of large size, quite in contrast with some recently collected ones which are not much larger than a Snowdrop.

Thanks to Holland, one can buy a beautiful display of color for very little money now, and the mixed Tulips of the catalogues should satisfy any owner of a garden not given to fads. However, a nice clump of some special variety or species is always satisfactory. If only one were to be chosen I would prefer *Tulipa Greigi*, which is the most brilliant in coloring, of fine form, and has handsomely variegated leaves. These are now becoming reasonable in price. Gesner Tulips pale before these, but are very satisfactory. I planted over my Tulips last fall some young plants of *Arabis alpina*, which covered up the bare earth, and the combination of the small white flowers under the Tulips was rather effective.

The Poppies have commenced to flower this week, led by *Papaver alpinum*, which seems less generally grown than *P. nudicaule* (the Iceland Poppy), one of its near relatives. The type has finely divided glaucous leaves, but does not differ in form of flower. There are yellow, white and red varieties, and some specially dainty ones which show just a suffusion of coloring in the white. These plants are perfectly hardy if their crowns are kept above the wet ground. It is better to sow seeds each spring. Seeds sown now will produce good flowering plants in late summer, and a majority of them will winter over safely the first year, at least, and be a delight at this time. The seedlings are not at all difficult to transplant if their long roots are borne in mind.

This is also the time of the Primroses, of which one never has too many. The modern strains of hybrid Primroses, of which Dean's is the best, are perfectly hardy and endure our warm summers, yet such is the uncertainty of the climate that last winter left me scarcely a plant alive. However, this may not happen again in another decade, and a new stock is easily grown from seed. This is a good time to start them, when their beauty is most persuasive. *Primula cortusoides* has wintered perfectly, the creeping rhizomes being frost-proof and the plants deciduous. They are graceful in flowering habit, but their reddish purple color is not pleasing.

Every one knows the big Crown Imperials, but I fear few know the beauty of the dwarf Fritillaries, many of which are now in flower. There is an endless variety of these plants, but one should commence with *F. Meleagris*, or Snake's-head

Fritillary, which has large pendulous flowers, white or brown or reddish, the latter curiously checkered. The Dog-tooth Violet, too, is generally known, though its beauty is not fully appreciated. The California forms are, perhaps, not more beautiful than those of the east, but they differ in effect and are well worth attention. They do well with me in a moist border in a very stiff soil. There has been a small procession of rhizomatous Irises in flower, and their numbers are daily increasing. They seem to come in about the following order: *I. rubro-marginata*, very dwarf; *I. Chamæiris*, yellow; *I. Olbiensis*, dark purple; *I. lutescens*, light lemon; *I. Statellæ*, creamy white; *I. pumila*, purple, and variety alba.

These flowers are all now in bloom, and they are not rare, expensive or difficult to secure.

Elizabeth, N. J.

J. N. Gerard.

Notes from Baden-Baden.

FRITILLARIA LATIFOLIA, var. nobilis, is a dwarf plant only three to five inches high, but the deep vinous-red bells are as big as a small hen's egg, and these enlarge under cultivation. A very pretty species is *F. alpina*; its small widening bells are of a chocolate color, having a bright deep yellow ring, making it very handsome.

Muscari azureum Freynianum is the largest form of *azureum*. It is very early and flowers here early in March, when its turquoise-blue spikelets make it very showy. *M. elegans*, newly introduced, has comparatively narrow and rather long spikes in shades of bright blue, with a tinge of violet. *M. Szovitsianum subcæruleum* is very striking, the pale sky-blue spikes giving it particular beauty. *M. polyanthum*, which I have introduced from Asia Minor, is somewhat late, but is, perhaps, the most showy of all. From four to six spikes come from one bulb, and these are very large, of a bright, deep and pure blue which at once attracts attention.

Iris Assyriaca is new and a showy species. It is a Juno of the Caucasica stamp, with ample foliage, and the flowers, of a milky white, or sometimes with a shade of blue, are produced in numbers all along the stem. From five to seven are open at once, and they last for three weeks.

Baden-Baden.

Max Leichtlin.

Canna Notes.

TO thoroughly prove the capabilities of a Canna the necessary conditions must be provided. These are good soil, with cow-manure added, an abundance of water and plenty of space. Two wheelbarrow-loads of cow-manure are often allowed for a single bulb. One load should be spread on the top of the bed and the soil forked out, and another dumped in the excavation. The well-mixed soil should then be thrown back and the bed neatly finished for low-growing marginal plants. A pail of water in the morning and liberal spraying with the hose at night is advisable.

The season of 1895 added two more Cannas to our tested list. Antoine Chantin (Farquhar) proved highly satisfactory. Its habit is graceful, with abundant foliage of a light but vivid shade of green, which contrasts charmingly with the flowers. I know of no other Canna which produces so many blossoms to a flower-stalk. I have counted from six to ten lateral clusters on a single stalk, seven or eight of them in bloom at one time. The color is pleasing and true to the description given—cherry-salmon.

Geoffrey St. Hilaire was less satisfactory. It is a good strong grower, but stiff in outline, and the leaves are not so purple or chocolate-colored as we are led to suppose. The flowers are said to be deep orange or capucine-red. The shade of red is far from agreeable and out of all harmony with the foliage. Dark-leaved Cannas should never be planted near a highway if the hose is to be used, as dust from every passing vehicle settles and sticks remorselessly upon the wet leaves.

Pittsford Mills, Vt.

G. A. Woolson.

The Lily Garden.

THE Lily borders on my ground are now offering the best evidence that the failures so often noted are caused by carelessness or by want of knowledge of the requirements of these plants. For many years I have advocated the practice of mulching Lilies deep enough to keep the frost entirely away from their bulbs, since careful experiments have made it evident to me that their hardiness is generally overestimated. It is frost, as I believe, which causes entire failure of many of the more beautiful sorts and seriously injures the most hardy ones.

In my experiments I have found it almost impossible to decide as to the method of planting which affords the greatest

satisfaction; whether in the mixed border, in groups, in beds with each variety kept separate, or in beds with all the species mixed without the slightest regard to class or order. For the past three years in our private garden we have adopted the latter plan, and in this way we have a Lily bed in which there are flowers from early in June until September.

Frost in winter and drought in summer are alike fatal in their results. All Lilies seem to like a loose moist soil which is well drained. Two of our native species, *Lilium Canadense* and *L. superbum*, grow freely in wet marshes or swampy grounds, their native habitat, but they both succeed better when planted in dry ground if properly mulched in summer, so that the soil is always moist and cool, and the same conditions best suit all other Lilies.

Our beds have been planted three years, the bulbs being placed singly about eighteen inches apart each way. They are a mass of strong-growing healthy plants; not a single variety has dropped out, and in many instances where but a single bulb was planted there is now a clump of six, notwithstanding that each spring all the small bulbs that form at the base of the stems the year previous have been removed. This plan should always be practiced, not only to increase stock, but to give the old bulbs all the plant-food within reach. The beds are covered about the first of December with coarse litter from the stable; we prefer that from the horse and cow stables mixed. This is put on to the depth of three inches, the paths between the beds being also covered to prevent the frost from working its way down from the outer edges to the bulbs. This has proved ample protection, and during the last six years the frost has never reached a bulb. *L. auratum*, which is generally considered a difficult subject to manage, has averaged three stems from a single bulb. Some of these are now (May 6th) two feet high and nearly three-fourths of an inch in diameter. Plants of *L. monadelphum*, which are quite as difficult to manage, are proportionately strong; *L. Hansonii*, which is provokingly slow to propagate, has this year nearly doubled in numbers, each stem being equally as strong as the single stems of last year. The delicate little *Lilium tenuifolium* and its nearly related *L. Chalcedonicum* are proportionately strong. Many of the latter will bear fifteen to twenty flowers on a single stem this year. Immense is the only word that fitly describes plants of *L. speciosum*. Last year we had forty flowers on a single stem, and this year we hope for what we have been trying for years to obtain—fifty flowers from a single spike. This is not from the *Monstrosum* section, a class we do not grow, leaving those for tastes that crave unnatural forms.

Lilium Brownii and *L. Colchesterii* produce flowers that for the brief period of their existence are equal to the best Lilies, and their near relatives, *L. longiflorum* and *L. eximium*, which are not reliably hardy, if the beds are only mulched so as to exclude all frost will thrive with as much vigor as *L. tigrinum*, which nothing can kill.

On the 10th of April we raked off the coarsest of the mulch, leaving the remainder, which is so fine as not to obstruct free growth of the more delicate kinds. As this is carried into the soil by the rains, we shall add more, using only that which is well rotted and fine. This is the only cultivation given, and all that seems required. We find the less we stir the earth the better, as the whole surface of the bed is a mass of fine roots, and anything which disturbs them injures the plants, not only for this year's production of flowers, but for the development of the bulbs, upon which future success depends.

Floral Park, N. Y.

C. L. Allen.

Saxifraga crassifolia.—This is one of the best of earliest-flowering hardy plants. The leaves are from six to eight inches long by four wide and obovate in outline. The flower-stalks rise directly from the root-stock, and the flowers, which are of a deep pink color, are borne on a thyrsoid panicle. This plant is used largely for spring bedding in England, and when set among blue and white Dutch Hyacinths the effect is very good. The large leaves of the Saxifrage give furniture to the beds and help to keep the soil cool and moist, thereby prolonging the flowering season of the Hyacinths. As this Saxifrage is quite hardy it may be used effectively for the same purpose here. It is easily propagated by division of the root, or by seed, which should be sown in the greenhouse early in February, and the seedlings grown on all summer for planting in the beds in the fall. We have another Saxifrage here which I have always known as *S. cordifolia*. The leaves are somewhat larger and heart-shaped, and come into flower about ten days later than *S. crassifolia*. According to *Index Kewensis* these two species are now considered identical, though they appear to be sufficiently unlike, horticulturally at least, to be distinguished by different names. Both are natives of Siberia.

Menyanthes trifoliata.—This pretty subaquatic or bog plant is now in flower, April 29th, on the edge of an ornamental pond in this garden. The stems are prostrate and the leaves trifoliate, with sheathing petioles. The flowers are borne on erect spikes from nine to twelve inches long. The individual flowers are white, with beautifully fringed petals, and are about half an inch in diameter. It belongs to the Gentian family, and is commonly called the Buckbean.

Stylophorum diphyllum.—This plant may well be considered as a standard herbaceous plant. It is one of the earliest to flower, and continues on well into the summer. The fistulate stems rise above the foliage, and the flowers are borne in an umbel at the summit. They are bright yellow, about two inches in diameter. Most of the leaves are radical, pinnatifid, and about one foot long. The stems have two opposite leaves just below the flowers, from which the specific name is given. It is easily propagated either by seed or division of the root.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Pampas Grass.—Last spring we raised some plants of Pampas Grass from seed, about a dozen in all. As soon as they could be handled they were put into thumb pots and then into three-inch size, and subsequently planted out along with other grasses. In the fall they were lifted and divided up into as small pieces as possible, put in three-inch pots, kept in a cool house and potted on and divided again, until now there are about a hundred nice healthy plants in four and five inch pots. They make their thick succulent roots so rapidly that it is surprising how soon they fill the pots. In this section of the country the plants occasionally get winter-killed if left unprotected. A good way to protect old plants is to place over the crowns old cement barrels with the ends knocked out and fill them up with dry leaves. This protection will carry them safely through very severe winters.

Viola pedata.—The Birdfoot Violet is probably the showiest of our many beautiful native Violets, and the ease with which it is cultivated should make it quite a favorite among spring-flowering plants. The plants succeed well in soil just the opposite to that in which they grow in their native haunts. In this locality *Viola pedata* is found principally in sandy vegetable mold, but in a border of heavy wet loam in which I put several plants three or four years ago, it thrives and flowers well. Of the three distinct forms which I have met in a wild state the commonest is the variety Bicolor, with the two upper petals very dark purple, the under ones pale lavender; this variety is especially showy. The monocolored form has the petals much the same color as the under petals of Bicolor. The third form is by no means common; the colors are rather startling, the two upper petals being dark, as in Bicolor, with the lower ones pure white. This is a shy bloomer and does poorly under cultivation. In a fully exposed part of the rock-garden here several pockets are given up to their cultivation. The soil provided is the same as that in which they grow naturally. Every year young plants come up thickly from self-sown seed. These are weeded out, as the old plants remain quite vigorous year after year. On the approach of hot weather the plants are given a top-dressing of leaf-mold annually, and for two or three weeks the display of bloom is gay.

Botanic Garden, Washington, D. C.

G. W. O.

Tussilago Farfara.—This imported weed, commonly called Coltsfoot, has given me much satisfaction as an ornamental plant since it possesses much beauty and fills an important place in the flower garden. Some years ago I planted several of these plants upon an embankment of red clay, sand and muck on the north side of one of the wings of the house, where it was exposed to the direct sunshine only in the afternoon. The plants speedily clothed the embankment, densely covering it with large tropical-looking foliage all summer long, while in March or April, before a leaf appears, it sends up many scaly stems five to eight inches long, bearing handsome rich yellow heads of flowers nearly an inch across, but fully open only in the sunshine. Besides, it endures our severest droughts and looks flourishing and healthy all summer long. It should, however, receive some protection in winter, as every part of the prostrate rhizomes, or root-stems, left uncovered is sure to be killed if exposed to the freezing and thawing of our changing winter, and this will be sure to destroy many of the curious flower-buds which form in autumn. All the parts covered, however, will be sure to live. The flowers are really pretty, but its foliage is its chief beauty. The leaves rise on long (eight or ten inches), thick purple stems, and attached directly to the creeping rhizome, or root-stalk, and are at first covered by a dainty covering of wool, which soon dis-

appears, and the leaves become of a beautiful rich shining green, with purple veins, round and broad, heart-shaped, angular, their greatest breadth equaling their length—that is, from six to eleven inches where broadest. I know of no low-growing plant that produces such a rich mass of large tropical-looking foliage. I heartily recommend this plant for densely covering embankments, slopes, stream or lake borders, where the soil contains clay, sand and muck or rich loam. But it should exclusively occupy the ground where planted, as it will crowd everything else out.

Rochester, Mich.

Wilfred A. Brotherton.

Correspondence.

The California Frosts.

To the Editor of GARDEN AND FOREST:

Sir,—The mean temperature of February was five degrees above the normal, while the mean temperature of April has been five degrees below normal. We have had very severe frosts in nearly all parts of the state, and, of course, vineyards, orchards and gardens have suffered. It will be impossible to determine the exact extent of the loss for a fortnight or more, but the best authorities think that the cherry crop of the state is lessened one-half. Almonds and Apricots also have suffered severely. Contracts are being made for wine grapes, delivered in autumn, at something like three times the price offered a month ago.

I lately visited the Sacramento Valley. At Chico I found that the crop of the famous Bidwell orchards was practically destroyed, excepting peaches, half a crop, and apples. Even the vegetable gardens in this district have suffered so severely that in some cases replanting several times over became necessary. One orchard of two hundred acres of large Almond-trees will not produce enough this year to pay for picking.

The spring frosts have not yet seriously injured the Citrus fruits, so far as I can learn; it is the deciduous fruits which have suffered most. Prunes have escaped fairly well in many cases; some districts will have a very light crop, and much fruit may yet fall from the trees. There is hope, of course, that higher prices may be the result, and so the net yield of many orchards will be kept up to the average, but the fruit-growers feel discouraged over the outlook.

The truth is, that California, like all other places, has fluctuating seasons, and if we plant immense areas in fruits, often without any scientific study of the locality in question, we must, of course, learn by experience. There are all kinds of climates here, some of them adapted to a wide range of vegetation. The chief characteristics of the climate of the leading horticultural districts are dryness of atmosphere and coolness of the nights.

The southern states excel California in raising sweet potatoes, melons, cotton and many other crops which require a moist, warm atmosphere. Cassava, sugar-cane and rice do not thrive as well in any part of California, so far as tested, as in the warmer coast regions of the southern states. Occasionally enthusiastic Californians attempt to introduce Cinchona into cultivation, or Coffee, Vanilla, the Cocoa Palm or Pineapples, but without success. Even our mildest and most perfect climates are fortunately far removed from the *tierra caliente* type. Every part of California is subject to the influence of our great mountain ranges. In ten thousand valleys and sheltered nooks up and down the Coast Range, or along the giant Sierras, vineyards and orchards are and will be planted in spite of occasional trying seasons which determine unfit locations, and readjust the industry to actual climatic conditions. New orchards will be more wisely planted; unprofitable orchards will be grafted over, or will give place to other crops. Different districts will settle down to the production of whatever fruit they can best produce, and we shall no longer hear, as now, of hundred-acre orchards of Apples, Peaches, Prunes, Cherries, Almonds or Walnuts, planted where the Apple, Peach, Prune, Cherry, or whatever else it may happen to be, is foreordained to be an uncertain crop. There is enough suitable land in California for all these industries, but it necessarily takes a good many years to trace out the minor isotherms.

Niles, Calif.

Charles H. Shinn.

The Evonymus Scale in Japan.

To the Editor of GARDEN AND FOREST:

Sir,—In the Report of the Department of Agriculture for 1880, Professor Comstock described *Chionaspis evonymi*, which had destroyed nearly all the shrubs of *Evonymus latifolia* at Norfolk, Virginia. At that time it was supposed to

occur also on Orange, but this proved to be an error, the species on the Orange being distinct. More recently the *Evonymus* scale has appeared on cultivated *Evonymus* in Europe, and in Italy economic entomologists have been at some pains to devise methods for its destruction.

Mr. Craw now sends me some twigs of the Japanese *Evonymus* on which are numbers of the same scale, mixed with a few *Aspidiotus rapax*. The plants arrived from Japan, and were destroyed by Mr. Craw in his capacity of horticultural quarantine officer. The occurrence is of peculiar interest, as showing the probability that Japan is the true home of this destructive scale.

While writing I may mention that Mr. Craw also sent a leaf of *Aspidistra* on which were many *Aspidiotus ficus*. It was from Osaka, Japan; 850 plants were destroyed. This insect is well known in America also, but it is a matter of special interest to note that very many of these scales from Japan show from one to three parasite holes, indicating that *A. ficus* has an important parasite in that country which it might be well to introduce here.

Agric'l Experiment Station, New Mexico.

T. D. A. Cockerell.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—On the landscape-gardener devolves the delightful task of helping Nature to make beautiful pictures of our homes. Here, in amateurish fashion, we try to imitate his work and devise harmonious effects each year.

By the front piazza is a group now in luxuriant bloom, consisting of the pink and white varieties of the double-flowering Almond, with clumps of *Mertensia Virginica* from a neighboring pasture-field, hiding the stems of the shrubs which are apt to be bare and unsightly. The lovely shades of pink and clear blue are relieved by the pure white of the Snowy Almond, and there are no high colors near to mar the effect. But the salient features of the garden now, on this second day of May, are the large-flowering Dogwoods, mingled with Red-buds, against a dark background of Cedar; the groups of flowering Apples and Cherries, and the beautiful mass of *Exochordas* and *Xanthoceros* in a prominent position on a little knoll. All this conspicuous bloom, together with many handsome red and white Japan Quinces and white *Spiræas* and a few white and purple *Magnolias*, is making the grove a lovely wilderness of flowers.

The rock-garden is very fascinating and has taught me many lessons of late. I have learned that *Alyssum saxatile*, *Santolina* and some other herbaceous perennials disappear in winter in a stiff clay soil, and that *Hellebores* cannot resist our hot, dry summers without plenty of watering. I have had reluctantly to give up the whole charming Heath family, with its beautiful *Andromedas*, *Kalmias*, *Rhododendrons* and *Azaleas*. They refuse to be happy in our most carefully prepared beds of peat and rich mealy loam. Our dry summers wither them, our winter suns scorch them, and they pine and dwindle and disappear. Only one member of the family remains with us, and that without special care. This is the fragrant *Clethra alnifolia*. I used to think I could, by constant care, keep *Rhododendrons* in comfortable health. They did not increase much in size, but they bloomed for me as long as they lived, though that was not a long period, and constant renewals were necessary to keep their border presentable. Now the last lingerer has vanished from Rose Brake, and they are among our extinct species.

But if *Rhododendrons* despise our stiff clay soil, *Roses* revel in it, and *Pæonies* thrive amazingly on the strong food we give them, and a multitude of beautiful plants are hurrying forward to fill up the vacancies in the shrubberies. Nature will not grow everything everywhere, and that is just the reason that each locality has its own distinctive charm.

Shepherdstown, W. Va.

Danske Dandridge.

Maple Sugar in Vermont.

To the Editor of GARDEN AND FOREST:

Sir,—The maple-sugar season of 1896 in Vermont began under difficulties. In many cases the weather made pleasant promises early in the season, which it failed to keep. Nearly all sugar-makers tapped their trees during the first week in April, and some as early as March 25th. But the cold, raw winds of succeeding days greatly interfered with the sap-flow. Later, however, the weather turned warmer, and for a week or two sugar-makers had all the sap they could handle. Some who have large sugar-orchards were forced to work nights as well as days. The season, as a whole, was much shorter than

usual, the bulk of the sugar having been made up within ten days. By April 15th most makers had finished, and by the 20th all were through.

The crop is probably above the average in quantity, but is said to be considerably above the average in quality. Constant improvement in methods and facilities of manufacture of itself tends to raise the quality of the product year by year. The use of improved evaporators gives cleaner and lighter-colored sugar than could be made in the old-style kettles; and the prejudice against the lighter-colored article is rapidly disappearing. It is probable that, without reference to this year's crop, the quantity of maple sugar made in Vermont is on the increase. The increase comes both from the working of a larger number of trees and from better methods of manufacture.

The prices realized for sugar and syrup vary greatly in different parts of the state and at different seasons. Some of the first sugar put on the market brought the makers sixteen to seventeen cents a pound, while a great deal was sold in the country markets at seven to ten cents. Probably the bulk of the crop sold up to date brought the makers ten to twelve cents. Syrup sold generally at from sixty to ninety cents a gallon, though many makers put their best product up in one-gallon cans and sold on private markets at \$1.00 a gallon.

The Vermont farmer feels that his sugar orchard is one of his best pieces of property. It has been estimated that such property pays an annual dividend of ten to twelve per cent. on the investment. Whereas a few years ago there was quite a tendency to cut Maple-trees and clear away the sugar orchards, the present feeling is rather to encourage the extension of the maple-sugar industry. Vermont is proud of the high standing which her maple sugar has achieved in the market, and she gives hearty support to the laws which enable her to give constant assurance that the standard will be maintained.

Last year's run of sugar was also somewhat below the average, which is probably about 15,000,000 pounds, not counting syrup. This is greater than the output of any other state in the Union.

There are a great many Red Maples throughout the state which are sometimes tapped without distinction between them and the true Sugar Maples. Some makers are really unable to distinguish the two species. Others consider both equally available as sugar producers. Still another faction consider the sugar of the Red Maples inferior and do not tap the trees, though they may be thickly intermixed with the true Sugar Maples which are being tapped. The preponderance of opinion seems to be against admitting the Red Maple to a full equality with the Sugar Maple as a sugar producer.

University of Vermont.

F. A. Waugh.

Trees and Shrubs in Flower at Germantown.

To the Editor of GARDEN AND FOREST:

Sir,—I am writing on the 8th of May, and trees and shrubs are much farther advanced than usual at this date. The first Pear-blossoms rarely open before the 5th of May. Now the petals have all fallen and the fruit is quite perceptible. The various varieties of the common Lilac, *Syringa vulgaris*, are now at their best, but this is little in advance of their usual season. The plant here that most deserves special mention, however, is *Ungnadia speciosa*, the Spanish Buckeye, which is now flowering here, and perhaps it has never flowered out-of-doors before so far north as this. Our plant came from Texas some ten years ago, and it has been killed almost to the ground every year, although it started up again vigorously each spring. For some reason it went through last winter without any protection, and is now flowering finely. The rose-colored flowers are large and handsome, opening in pairs, with two or three pairs clustered together. Unlike other Buckeyes, its leaves are pinnate, and the young shoots remind one of the Walnut as they burst forth. It becomes a tree of considerable size in some parts of Texas, and, no doubt, with some protection it could be made to flower in this latitude every year. Other trees and shrubs in flower which attract attention now are the Paulownias, the beautiful *Magnolia Fraseri*, the Silver-bell Tree, some of the Thorns, our native Crab, the Flowering Dogwood and its varieties, *Viburnum Lantana*, *Xanthoceras*, the rare *Neviusia* from Alabama, *Exochorda*, sometimes called the Pearl Bush, a near relative of the *Spiræas*; *Rhodotypos*, *Kerria*, *Spiræa Thunbergii*, which is almost past its best; *S. prunifolia* and *S. Van Houttei*, which is just in flower; the Tartarian Honeysuckle and some of the early-flowering *Tamarisks* and the hardy *Azaleas*. The list, however, could be made twice as long.

Germantown, Pa.

Joseph Meehan.

Recent Publications.

Hand-list of Coniferæ grown in the Royal Gardens at Kew.

—Students and cultivators of coniferous trees will find this hand-book a helpful guide to the plants cultivated in the Royal Gardens, and a useful key to the synonymy and geographical distribution of the species of this most important order. Two hundred and twenty-seven species, with 340 varieties, belonging to thirty-seven genera, are enumerated. In the preface, which was prepared by Sir Joseph Hooker, who for more than half a century has devoted special attention to the study of these plants, we learn something of the increase of knowledge with regard to them. Of the *Abietineæ*, Linnæus, in 1753, knew but ten species, all of which were included under his genus *Pinus*. In 1789, when the first edition of Aiton's *Hortus Kewensis* appeared, the number of known species had increased to nineteen; in 1841 the number had increased to fifty-two, and in 1866, when Parlature published his classical monograph of the *Coniferæ* in De Candolle's *Prodromus*, one hundred and sixty-two species of *Abietineæ* are described.

Among some of the interesting plants in the old Kew Pinetum is a specimen of *Ginkgo biloba*, introduced in 1754, and originally trained against a wall like a fruit-tree. The *Deodar*, *Cedrus Deodara*, was introduced in 1831. It has not proved satisfactory at Kew, and has disappointed the expectations formed of it, while the Mount Atlas Cedar, *Cedrus Atlantica*, grows with great rapidity. One of the most conspicuous trees in the garden is a specimen of *Pinus Laricio*, planted in 1825 and still in good condition.

The value and interest of the Kew collection of conifers is greatly increased by the facilities afforded by the temperate house for growing to a large size representatives of genera which are not hardy in the English climate, like the *Araucarias*, the New Zealand, Malayan and New Caledonian species of *Agathis*, a genus related to *Cunninghamia* and *Araucaria*, and the Tasmanian *Arthrotaxis*, *Tetraclinis*, *Callitris* and *Actinostrobus*, *Widringtonia Whitei*, the Milanji Cypress, from the mountains of eastern equatorial Africa, an interesting timber-tree probably of great economic value, the *Fitzroyas* of Tasmania and Patagonia, and several others.

Some idea of the richness of the Kew collection in hardy conifers will appear in the fact that twenty-six varieties of the common *Picea excelsa*, or Norway Spruce, are cultivated, while of the ordinary Yew no less than thirty-seven garden varieties are enumerated. The arrangement of the genera and the names and synonymy are those now generally adopted by Dr. Masters, the learned editor of *The Gardeners' Chronicle* and the English authority on conifers.

The value of the Hand-list, which is sold in the Royal Gardens for threepence, is very greatly increased by a full index of the names and synonyms of all the plants which it enumerates.

Notes.

* Professor William Saunders, Director of the Experimental Farm in Ottawa, has received the degree of Doctor of Laws from Queen's University for work done in advancing agricultural science and for work of a similar character in connection with the Royal Society.

Now is the time for beginning work against the Elm beetle, and all persons who have any responsibility for trees in public grounds or private places should prepare at once for an active campaign. The Town Improvement Association of Plainfield, New Jersey, did a timely thing last week by inviting Mr. Southwick, Entomologist of the New York Park Department, to deliver a lecture, with illustrations of the most dangerous insects and the most approved machinery for holding them in check. If the people of Plainfield follow Mr. Southwick's plain directions they will not be lamenting over the defoliation of their street-trees this year.

The early-flowering bush Honeysuckles, like *Lonicera Standishii* and its near ally *L. fragrantissima*, whose odorous

flowers appear before the leaves, opened here fully a month ago, but just now *L. Morrowi* is covered thickly with its little white flowers somewhat in advance of the Tartarian Honey-suckles. This is a beautiful plant, and later on it makes a fine appearance when in fruit, although, perhaps, not quite as interesting in late June as *L. Ruprechtiana* with its dark red bloom-covered berries. These two are among the very best of garden shrubs for this latitude, being perfectly hardy and of admirable shape and easily propagated. *L. Morrowi* comes from Japan and *L. Ruprechtiana* from Manchuria.

The single-flowered form of *Pæonia tenuifolia* is rare in gardens, although, like many other single-flowered *Pæonias*, it is handsomer than the double-flowered variety. The segments of the leaves of the single-flowered *P. tenuifolia* are rather broader than those of the plant more generally grown, which is also beautiful in form and color. Both are perfectly hardy, and once planted they need only ordinary care to flower abundantly every spring. Another beautiful flower which is rather ahead of its time is the Satin Flower, *Ornithogalum nutans*, a plant of the Lily family, with a raceme of half a dozen nodding bell-shaped flowers an inch long with white perianth segments flushed with pale green without and shining like satin within. It is an old-fashioned flower and it does not deserve the neglect into which it has fallen.

Professor W. F. Massey writes to *The Southern Planter* that he begins to doubt whether the Albemarle Pippin is simply the Newtown Pippin modified by soil and climate. During last winter he has had winter apples sent from the best Pippin-growing region of Albemarle, produced by trees which had been brought from the north. They were not identical with the genuine Albemarle Pippin, but were distinctly the northern Newtown Pippin. He thinks there is danger that the growers of what is known as the Albemarle Pippin will lose their prestige if they continue to get Newtown Pippin trees from northern nurseries and plant them in the hope of getting Albemarle Pippins. The only safe course, he thinks, is to propagate from the original Ragged Mountain stock and consider the apple as a distinct variety. Whether it is so or not is a matter for pomologists to discuss. If the two varieties are not distinct he believes that it will take generations to change the northern form to a genuine Albemarle Pippin. He adds that Wine Saps and York Imperials grown in the Piedmont country are becoming the most popular apples in the northern and foreign markets, and that both in Virginia and North Carolina there are thousands of acres where these varieties can be grown, to one acre where the Albemarle Pippin will thrive.

Some time ago we published an article relating to the appreciable drying up of the small lakes of Minnesota and of South Dakota. From this it appeared that throughout the whole area of these states the larger lakes had diminished in volume, and the smaller ones have dried up. The monthly *Weather Review*, published by the Department of Agriculture and edited by Professor Cleveland Abbe, in speaking of these facts, says that the average rainfall for ten years past may have been slightly below the normal in these states, but not so much below as to justify the conclusion that this change in the lake levels is due to any great change of climate or meteorological condition. The true reason for this drying up of the lakes is said to be the cultivation of the soil and the artificial changes in drainage. Every acre of virgin prairie plowed up and cultivated begins to evaporate into the air the moisture that it formerly held, every new drain that is dug helps the water that once settled in the soil to flow off into the river. Agriculture begins with an effort to drain rich lowlands that are too wet and ends by artificially watering the dry uplands and warm lowlands—that is, we begin by evaporating and draining off the water that we eventually wish to get back again. To all this it may be said that the advocates of underdraining uplands claim that this practice by changing the texture of the soil and in other ways actually leaves more available moisture for the roots of crops than could be found in the same soil before the drains were laid. That is, it is held that underdraining is a good defense against drought.

Professor John B. Smith, of the New Jersey Experiment Station, writes to *The Rural New-Yorker* that he is about leaving for California to study the character of the ladybird beetles, which feed on scale insects in general and upon the San José scale in particular, so as to determine which of them offer the best chance of surviving in the east. When he has selected the California insects he will distribute them at different places in New Jersey and in Florida, and colonies will also be sent to Maryland and Virginia, so as to give these insects from the

Pacific coast as many chances of becoming acclimated as possible. It may be that they will survive without any trouble in Florida, and from Florida colonies can be easily sent north. If they survive in Virginia it will be easy to select specimens to send to New Jersey hereafter, and the chances are that each generation will become a little better fitted to sustain our changeable climate. The reason for all this is that the San José scale, introduced from California some years ago, is increasing rapidly in the east, and no applications have been as yet successful in arresting their progress. On the Pacific coast there are natural enemies like the ladybirds introduced from Australia, which hold the scales in check, and although there are many difficulties in the way of introducing insects from one climate to another where they differ so widely as the Pacific coast climate and our own, still there is ground for hope that some species, if properly selected, might endure our climate. At any rate, it is worth trying, and the Legislature of the State of New Jersey, at the request of the Board of Agriculture, appropriated last winter a thousand dollars for the experiment. Professor Smith's mission and its results will be watched with interest.

Bidwell peaches, from Florida, the first of this fruit seen this year, were sold here on the 7th instant, and now command \$1.00 to \$1.25 a dozen at retail. Peaches from New York state hot-houses, the white skin beautifully marked with pink, cost from \$2.00 to \$10.00 a dozen in boxes holding six neatly wrapped fruits. Cherries, from California, are coming in limited quantities, owing to injury to the crop by frost, and not in the best condition, but are of fair size and color. They cost \$1.00 a pound. The first cherries of the season from North Carolina reached New York on Monday, but were small and unattractive, and met no demand. Richly colored strawberries, from Charleston, of large size, long and green at the tip, on Saturday sold for thirty cents a quart box at retail, and the first Downings, from Maryland, more spherical and even deep red in color, brought twenty-five cents. Cups of Sharpless strawberries, from near-by hot-houses, containing a dozen immense fruits, cost fifty cents, and smaller berries twenty cents. These are decorated with their own foliage. Navel oranges, from California, may still be had for seventy-five cents, and grape-fruit, from Jamaica, for \$1.00 to \$2.00 a dozen. Limes cost from thirty to fifty cents a dozen. Shipments of Jamaica oranges continue, and one steamship last week discharged 228 barrels of this fruit at this port, besides 14,000 cocoanuts. Porto Rico pineapples of the largest size, with luxuriant tops and three to six heavy shoots at the base, command seventy-five cents each. Lychee nuts are seen in all the best fruit-stores, and, more rarely, cocoanuts in their outer shell, and Brazil nuts in round shells five inches in diameter, each enclosing from eighteen to twenty-four individual nuts closely packed together.

The windows of the uptown flower-stores still make attractive displays of choice flowers in simple and harmonious arrangements. One window of the four in one of the best establishments, on Saturday, showed half a dozen small vases containing loose, graceful masses of the yellow Sweet Sultan, *Centaurea moschata*, the clear lemon-fringed flowers standing out effectively above the Asparagus with which the floor was loosely carpeted. The only other decoration in this window was an immense bronze vase bearing a mass of the bold and striking Parrot tulips, with their confusion of rich yellow, green and crimson splashes and stripes, relieved by handsome glaucous foliage. Neat and tasteful flat bamboo baskets in their natural color, for orders for cut flowers, were displayed by another firm. Here the clean and cool-looking white tile flooring made a suitable summer relief for vases of Moss rosebuds, a bright mass of Meteor roses, sprays of flowering Almond and Dogwood, and boughs of Apple-blossoms. The most conspicuous flowers were clumps of late single crimson tulips, with purple-black markings at the base of the petals. Other showy exhibits were groups of light gladiolus, the bright red *Pæonia tenuifolia*, and William Scott, Tidal Wave and Helen Keller carnations, while among less showy offerings were the delicate white blossoms of Swainsonia, the yellow-flowered *Alyssum saxatile*, lily-of-the-valley, handsomely marked pansies, violets and sweet peas. The excessively hot days in April forced hot-house plants into early and profuse flowering, some kinds being urged six weeks ahead of the rightful season. Except in the case of carnations, which had been in scant supply, a glut naturally followed. Now that this is past there is sufficient scarcity of roses and some other cut flowers to hold up wholesale prices, and the season for flowers grown under glass will undoubtedly be shortened.

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The Revised Plan for Jackson Park, Chicago.

AT the exhibition of the Architectural League, held in this city last winter, there was a plan for the improvement of Jackson Park, Chicago, prepared by Messrs. Olmsted, Olmsted & Eliot, of which we spoke at the time, and we have since then secured a reduced sketch, which we present to our readers on page 205, although, of course, many of the finer details are not evident as they were in the original. On page 204 we present for comparison the plan for the World's Fair site, which covered the same area, and if we had space it would be interesting to republish a copy of the original plan of Jackson Park, made in 1871 by Olmsted, Vaux & Co., and which contained many of the fundamental ideas which were developed in the later creations. The plan of the World's Fair grounds, on page 204, was originally published in volume v., page 291, of this journal, and the description then given would be found of interest in connection with the present design. The elements of the scenery of the park are: (1) the broad view of Lake Michigan commanded from the Shore Drive and the Concourse on Sunrise Bluff; (2) the spacious fields between the lagoons and the lake and between the lagoons and the south-west entrance, each presenting broad, quiet landscapes of the simplest pastoral sort, which are pleasingly commanded from the adjacent drives and walks; (3) the lagoons, with their intricate and bushy shore-lines, their beaches and bridges, their almost complete seclusion, with a scenery in strong contrast to that of the lake-shore and fields—scenery which can be enjoyed not only from the shore, but particularly from the boats.

The decision to retain the Art Building of the World's Fair for the Field Columbian Museum made it necessary to revise all the road-lines, together with the walks which had been designed for the original park and some of those which had been retained during the Fair, so that the surroundings of the great building should be in harmony with it. The Circuit Drive is now symmetrical to the right and left of the north and south axis of the Museum, and the straight road across the north front has been moved farther away. The pond south of the buildings is to be recon-

structed into a symmetrical basin with architectural outlines, and since the character of the planting on the margins of the lagoons will make them unsuitable for skating and will not permit the public to walk along the water margin, the Museum Basin provides for a broad walk a foot above the water-level, so that the basin can be used for sailing toy-boats and skating. In connection with these dominating architectural works provision has been made for considerable decorative planting of a formal kind. The large conservatory which it had been determined to build in Washington Park has been appropriately placed in the formal grounds about the Museum, where it will not be in view from any important part of the building and where the differences in the style of architecture of the two will not be unpleasantly obvious.

The North Haven and Wooded Island will remain substantially as they were during the Fair, although the shore of the lagoon is to be more varied with islands and bays. The west shore of the west lagoon, where the water seemed too narrow, will be carried a little farther to the west. The south end of this lagoon will be widened and extended, leaving a long and narrow island where the Electricity Building stood. The sites of the Government Building and Manufacturers' Building will be turned into slightly undulating meadow, which will be used for tennis and other lawn games. The Grand Basin in the Court of Honor will have its outline changed into irregular forms, and it will become the northern end of the South Lagoon and the Middle Bay. The view from the West Lagoon Drive is mainly to the eastward over to the lagoon, and therefore the space between the drive and the west boundary of the park would be of comparatively small landscape value, except as affording a screen of foliage against the city, and therefore two athletic grounds have been planned here, one for men and one for women, and a smaller space for small children and infants, with suitable buildings, on the general lines of similar grounds in Charlesbank, Boston, which have proved very successful.

In the south-west corner of the park will be a sixty-acre field with a slightly rolling surface, which will not only have great value as a piece of landscape, but may be used for field games of all kinds. It will be restricted, however, to the use of boys and girls of grammar-school age, not only to diminish the wear of the turf, but to lessen the danger to visitors by stray balls, which would be more dangerous if thrown or batted by men. For the first time a special provision for bicycles has been made in the shape of a path around the ball-field, with a large stand, surrounded by shade-trees, for refreshments and the social reunions that are apt to take place. This bicycle-path is not for speeding, but for such promenading as is provided for equestrians in London at Rotten Row. A bridle-path also makes a complete circuit of the path south of the Columbian Basin.

The point of land between South Haven and the lake is to be treated as a wild, wind-swept series of dunes. The ground will have the form of dunes and will be planted on the slopes toward the lake with Beach Grasses and Sedges, Beach Pea, low shrubs and other perennials. Back of the dunes Red Cedars, Prostrate Junipers, Beach Plums and other bushes appropriate to sand dunes will be grown with Beach Pine and other native Pines on the lee or western side of the highest bluff, of which advantage is to be taken to afford a commanding view for persons in carriages, as the Concourse at this point will rise to a height of twenty-five feet above the lake. The University of Chicago having developed since the original plan was made, and being situated on the north side of the Midway Plaisance, an opportunity has been provided here for boat-racing and boating carnivals, and the series of basins connected by narrow canals in the original plan has been changed to a canal uniformly a hundred feet wide and long enough for a mile race. The bridges to carry streets across the canal will have a hundred-foot span, so as to offer no obstruction to navigation. A broad walk on either side of the

canal affords facilities for thousands of people to view the races and carnivals without danger of damaging the grounds. Since the lagoons in the park are entirely unsuitable for racing or other spectacles which would cause great crowds to assemble on the shores, this will afford opportunity for wholesome sport without danger to delicate natural planting.

A mound from six to eight feet high, with a comparatively gentle slope all round the north, west and south sides of the park, is to be constructed for the purpose of concealing the city streets even in winter, and to reflect back as much as possible the noise of city traffic. These mounds are to be covered by trees, spaced sufficiently far apart to permit them to grow low branches, and dense shrubby plantations will be grown outside of them and under them.

This is the plan in general outline, but we have omitted mention of the facilities for boating and yachting and many provisions for public accommodation apart from those which directly help to the enjoyment of the landscape. There are an unusual number of such introductions, and the skill of the architect is shown by placing these, not only so that they will do as little damage as possible to the turf and the plantations, but in such a way that they will not injure the beauty of the prospects and will interfere as little as possible with visitors who come to the park for the enjoyment of the landscape, for quiet and for secluded recreation. Besides the structures we have mentioned, like the conservatory, the museum and the like, we might name the picnic shelter at the north-east corner of the park, the Germania restaurant, the bath-house, the music court, the various field houses connected with gymnasium grounds for men and women, with the tennis lawns and ball ground, the Japanese temple, the casino, the service yards and administration buildings, the life-saving station, the Belvedere, with numerous shelters, boat-houses and landings, carriage-sheds and many other artificial works which by their nature detract from the beauty of the landscape, but which all have been concealed by grading or subdued by foliage. That is, in preparing all these attractions and conveniences the primary purpose of the park has never been lost sight of. The landscape is the essence of the park. The green pastures and still waters—pictures of peace—the outlook over the great inland sea, all the commanding charm of the place, has been preserved and heightened for the refreshment of city-wearied senses. A study of the map is like a visit to the country. One can plainly trace long lines of view which offer every advantage for enjoying the scenery. There are scores of these vistas, and they control the outline of the lagoons and islands, the grading and alignment of the roads and walks and the shape and character of the plantations. Some of them are purely natural and others are directed to bridges or buildings, which, of course, will be carefully designed. Especial attention is called to the extension of the south lagoon which lengthens the charming view through the middle of the park lengthwise of the lagoons, with the Belvedere at the southern boundary of the park as an objective point for the long vista from the north end of the east lagoon.

Shrubs, Native and Foreign.

THE uncertainties of gardening are apparent this spring in the neighborhood of Boston, where many shrubs, usually considered perfectly hardy, have suffered during the past severe winter, which has left others, that might have been expected to have suffered, untouched. All the species of *Forsythia*, usually remarkable for the profusion of their flowers, have practically been flowerless this spring, although their wood is uninjured. The Japanese Weeping Cherries, *Prunus pendula* and *Prunus Miqueliana*, which have usually been considered perfectly reliable, have lost all their flower-buds. Ordinary Cherry-trees have been nearly flowerless, and Pear-trees promise but a scanty crop of fruit. *Spiræa Thunbergi* has lost, as usual, the tips of its branches and most of its flower-buds, and the *Wistarias*

are without flowers. Well-established plants of *Deutzia Sieboldiana* are in many cases killed to the ground, and *Deutzia gracilis* has lost more of its wood than usual.

On the other hand, Ghent Azaleas, which frequently lose their flower-buds in severe winters, promise this season an exceptionally large crop of flowers. *Rhododendrons* of the Catawbiense type are uninjured in foliage and flower-buds, and conifers generally are in better condition than usual at this time of the year. Apple-trees are covered with bloom, and all the various Japanese, Chinese and Siberian Crabs are covered with flowers. The Japanese *Pyrus Toringo* and its lovely double-flowered variety, *Pyrus Parkmanni*, have never been more beautiful, and the value of these plants in decorative planting has never appeared greater than it has this spring. All the *Magnolias* of the Yunan section, with the exception of *Magnolia Kobus*, which still remains flowerless, have bloomed profusely, and have this season been unusually satisfactory, as the flowers have been untouched by frost or rain. All the varieties of the common Lilac are as full of flower-buds as usual, and *Syringa pubescens* is uninjured, and in a few days will cover itself with its charming fragrant flowers. The flower-buds, however, of *Syringa oblata* of northern China have been greatly injured, although the semi-double flowered hybrid of this plant, with *Syringa vulgaris*, has escaped injury. This is the earliest of all Lilacs to bloom, and for this reason, although the flower-clusters are not large, it is a desirable plant. *Cornus florida*, which in the latitude of Boston often loses its flower-buds in severe winters, is uninjured this year; and the severity of the winter has made no impression on the flower-buds of the American Judas-tree, *Cercis Canadensis*. The bush Honeysuckles are all uninjured, and native *Viburnums*, *Roses* and *Cornels* will bloom as usual.

A winter like the last one emphasizes the fact, if it needs emphasis, that our native shrubs are best suited for our climate, and that foreign plants, however hardy they are usually, are more liable to suffer than native species. Many exotic shrubs, even those which are considered the hardiest, are disfigured in spring by dead branches, and when such shrubs are used in great numbers, as they have been in the Boston parks, the labor of cutting out the dead wood is so great that it is rarely attended to, and shrubberies present a shabby appearance all summer. Our native shrubs, of course, die sometimes during severe winters or lose part of their branches, but, as a rule, they are in better condition after a hard winter than any of the exotic species, and with each succeeding season we feel more and more convinced that for planting on the large scale which must be practiced in public parks, or on large private estates, the most satisfactory material will be drawn from the native flora.

Product of White Pine per Acre.

ONE of the elements that need to be known in order to discuss the profitableness of forestry is the amount of useful wood which can be produced per acre. On this point the most erroneous and extravagant notions exist, and many calculations are made on paper which can never be realized. The rate of growth of a tree at a given age is supposed to continue indefinitely, and this rate is applied to an acre of trees, the number per acre being guessed high enough to make a good showing, and then the total amount of wood, or at least a large percentage of it, is supposed to be usable, and thus we can compute astonishing yields for the future.

The latest contribution to these rosy prospects is contained in an article by Mr. Edward Hersey, Superintendent on the Bussey Farm, near Boston, on the value of the White Pine as a timber-tree, which, besides several surprising statements regarding the felling time for Pine, contains the following:

Careful measurements and estimates of the product of many acres of Pine timber in Plymouth County, Massachusetts, have led me to the conclusion that where there is no other timber

mixed with the Pine, on a warm, loamy soil, in a growth of from thirty to thirty-five years, one hundred thousand feet of box-boards may be obtained; but on an average soil the usual thirty years' growth has been found to be about fifty thousand feet, when but little other wood is mixed with it. The expense of cutting, drawing, sawing and drying is from \$5.00 to \$6.00 per thousand feet, which, at the present price of box-boards, would leave the owner of the land about \$2.50 per thousand on the stump, or \$125.00 per acre. This sum would pay a good interest on the investment if the land had cost not more than \$15.00 per acre when the Pines first started to grow.

Supposedly, the writer, when speaking of feet, does not refer to the usual unit of board measure, but to the superficial foot with a five-eighth-inch thickness to which box-boards are usually cut. Translating his measure, therefore, to the generally accepted board measure, the 100,000 and 50,000 feet represent 62,000 and 31,000 feet, B. M., respectively. These amounts he claims can be grown in thirty to thirty-five years.

To simplify further, we may translate this measure into cubic feet of forest-grown material. It is well known that in sawing there is a necessary waste in sawdust and slab amounting, according to the diameter of the log, to from twenty to seventy-five per cent.—the smaller loss on large, the larger loss on small logs. A straight log ten inches across at the smaller end and ten feet long will waste sixty-five per cent. in common mill practice—that is to say, of the 5.4 cubic feet of wood in the log 3.5 feet are lost, and only 1.9 cubic feet reappear in the boards as they fall from the saw. In other words, to produce one thousand feet, B. M., one needs to have, not eighty-three (that is $1,000 \div 12$) cubic feet of log, but 240 cubic feet.

Since in growths of from thirty to sixty years the amount of ten-inch log material forms only a small part, the wastage on the average would be considerably greater. Yet, to throw the advantage altogether to the other side, we will not only admit no larger wastage, but in addition assume that all the wood from base to top can be utilized, although the useless tops will in reality average, according to size, from ten to fifty per cent. and more of the total growth of wood per acre. We would then require for Mr. Hersey's claim 7,400 cubic feet of wood on the acre for the smaller and twice that amount for the larger output, claimed by him as possible, at from thirty to thirty-five years of age. Although the White Pine is among our best producers, both these figures are absurdities, into which the writer has probably fallen by underestimating the age of the growths which he measured. The Division of Forestry has during the last two years made careful and accurate measurements of many acres and some five hundred sample trees of varying age from various conditions, which go to show that these estimates are from fifty to a hundred per cent. too great. Unfortunately, not a sufficient number of acre yields of the age of thirty to thirty-five years has been measured to permit their use for argument, but it will suffice to show that groves of forty and fifty years of age do not produce the amounts claimed, and that it would require a good stand of sixty to seventy years' growth and more to produce anything like the larger figure of 14,800 cubic feet.

It so happens that among the acres measured there were three from three localities in Plymouth County, Massachusetts, the very region to which Mr. Hersey refers. Their record is as follows:

No.	Age.	All the trees over 3 inches.		All the trees over 6 inches.		All the trees over 10 inches.	
		Number.	Volume.	Number.	Volume.	Number.	Volume.
1	52	328	6,559	313	6,517	182	5,064
2	50	415	5,479	346	5,279	116	2,681
3	45	475	5,831	376	5,545	136	3,111

All three stands were considered well stocked. The last one is of special interest, as it originated by sowing a piece of pasture (seventeen acres) to Pine just forty-five years before it was measured, and was considered specially well

stocked; the owner claimed to have cut fifty cords to the acre, which he calculated equal to 30,000 feet, board measure, a rather incredible result, even when the total volume of the trees over six inches is supposed to yield box-boards.

Even if we admit the entire wood production of trees over three inches in diameter on the best acre given above amounting to 6,559 cubic feet to cut box-boards, this would fall short by twelve per cent. of Mr. Hersey's figure, although the trees were twenty years older. In reality, only the trees over ten inches, or eight at best, could be cut even into box-boards. The best average production of wood per year per acre (all included) during the first fifty years appears to be round 150 cubic feet, which for the age of thirty-five years would make the yield 5,250, of which less than one-half might be fit even for box-boards, and 15,000 feet, board measure, would be quite a remarkable result. The acres of thirty to thirty-five years measured, which, however, we do not consider good, cut fifty per cent. less.

In growths forty years old, of which we have a number measured, there will be 400 to 500 trees, in the average about 425 to the acre. According to the greater or less number the diameter classes vary; no trees will have reached a diameter over eighteen inches, and only few, not more than twenty-five to thirty at best, over fourteen inches, the majority falling in the diameter class of six to ten inches, and the number between ten and fourteen inches is rarely over 150, the total volume varying between 4,000 and 6,000 feet per acre. At best 20,000 feet, board measure, may be cut, more likely much less.

There is no doubt that by judicious thinning at the right time and in the proper manner the yield could be increased, but not even with the best practice would this increase amount to more than twenty-five or thirty per cent., individual development rather than increase of total yield in the final harvest being the object of the thinnings.

Mr. J. D. Lyman, of New Hampshire, has a growth of White Pine two-thirds of an acre in extent, fifty to fifty-five years of age, which he has thinned so that in 1894 only 146 trees remained, or 223 to the acre. As a result a very considerable development of the individual trees is noticeable, but not much in the total volume per acre. Most of his trees are over ten inches in diameter, at least sixteen of them are over fourteen inches, and the best measured 22.2 inches, the height being seventy to eighty feet. The calculated volume corresponds to a production of 7,185 cubic feet of wood an acre, which under very careful practice might cut 30,000 feet, board measure. The best forest-grown tree, fifty-four years of age, which we have found standing on this ground was eighty feet high, with a diameter at base of eighteen inches, and a diameter of four inches at sixty-five feet, containing altogether seventy-two cubic feet of wood, sixty-five of which were capable of being cut into lumber. This tree at thirty years of age was only 10.8 inches in diameter; at forty years fourteen inches, and the four-inch top diameter was then at about fifty-five and sixty feet respectively. If we assumed it possible to have 300 such trees standing on an acre, which would be twelve feet each way, the total amount of wood at fifty-four years would be 21,600 cubic feet, of which 19,500 would make lumber cutting, say, round 100,000 feet, board measure. This would be an ideal stand, which general practice can hardly hope to attain.

In all the above calculations it must not be overlooked that we have made reference only to box-boards—that is, the lowest quality of boards, extremely knotty. If the object were to grow saw-timber with the largest amount of clear material the results would be entirely different, since that would require the growing of a much larger number of trees per acre until the twenty-fifth or thirtieth year, when the individuals would develop in length and by the close stand clear each other of branches, but the diameter development would suffer. Then they should be thinned to develop diameter, but it would be necessary to give considerable time before good sizes are developed;





before the trees are 90 or 100 years it would not pay to cut them, and then 100,000 feet, not of common box-boards but of good lumber, may well be expected.

Forestry Division, Washington, D. C.

B. E. Fernow.

Foreign Correspondence.

Bamboos in English Gardens.

DURING the last six or eight years considerable attention has been given by certain English and French horticulturists to the Bamboos that are sufficiently hardy to be cultivated out-of-doors in the warmer parts of the kingdom. Previous to this period Bamboos were practically unknown as ornamental plants for the garden, the only species grown generally being the plant then known as *Bambusa Metake*, while *Arundinaria Falconeri*, often erroneously called *A. falcata*, was cultivated in a few gardens where the conditions were exceptionally favorable. In 1866, Colonel Munro prepared a monograph of *Bambusaceæ*, and in his introductory remarks he stated that "a large number of Bamboos are now in cultivation, and, perhaps, twenty species at Kew alone. I am informed there are at least fifty in Paris. Few of these, perhaps of *Arundinaria* only, are hardy in England, or even in the warmer parts of Ireland." There has been a collection of hardy Bamboos at Kew for at least twenty years, and, according to a letter from the late Canon Ellacombe to Sir Joseph Hooker in 1879, he had then in his garden at Topsham, near Exeter, "flourishing most vigorously, a collection of twenty *Bambusæ*, all named by General Munro." Nothing, however, appears to have been done to prove the value of Bamboos for the outdoor garden until Kew, Mr. Mitford and Sir E. Loder took the matter in hand. The Kew collection was formed partly by purchase from the Japanese nurserymen, from Monsieur Marliac, of Temple-sur-Lot, and from the collection formed by the late Monsieur Lavallée at Chateau du Segrez, near Paris. A garden was made specially for them in a sheltered, picturesque position, and the collection, consisting of about forty sorts, was set out in groups and masses. At the same time Mr. Mitford had decided to make a feature of hardy Bamboos in his lovely garden at Batsford, near Stratford-on-Avon. He has always taken an interest in Kew, partly from his love of plants and also from his having held for some years the position of secretary to the minister in whose department the Royal Gardens are. Probably the collections at Kew and Batsford are equally rich in number of species and varieties of Bamboo, and the success met with in their cultivation in these two gardens appears to be on fairly equal lines. Mr. Mitford has utilized the resources of Kew in naming and working out the history, cultural requirements, etc., of Bamboos in a most interesting book,* in which he states that the task of preparing it has not been an easy one, and would have been impossible but for the kindly help and encouragement which he received from Sir Joseph Hooker, Mr. Thiselton Dyer and several members of the Kew staff. The outcome of Mr. Mitford's thoroughness and perseverance in working up material for his book is a work of considerable value, both to botanists and horticulturists. It embraces all that is known of all the hardy Bamboos in cultivation in England; consequently it will be accepted as the recognized authority on all matters appertaining to these plants for some years at any rate.

The book is divided into chapters which treat upon the formation of the Bamboo garden and the positions and best time of planting for the plants; their propagation; the uses of and customs and superstitions connected with Bamboos; their classification according to easily recognized characters of habit, culm, leaf, sheath, etc.; description and history of each species; the future possibilities of these "Royal Grasses"; a plea for Bamboos ("Apologia

pro *Bambusis meis*"), and a list of the Japanese names of Bamboos, with their botanical equivalents.

Mr. Mitford is preëminently qualified to write about Japanese Bamboos from his having resided for some years in Japan. He is the author of *Tales of Old Japan*, described as "pictures of Japanese life and manners not worked out in the monotony of minute detail, but dashed in with bold, telling touches." His Bamboo book may be described as a happy combination of scientific accuracy, reliable practical directions, and a skillful, charming style. Even the descriptions of the species are drawn up in such a way as to interest even readers who know nothing of Bamboos.

Mr. Mitford, while modestly calling his book a descriptive list, claims an attraction for it "in the admirable drawings furnished by Mr. Alfred Parsons." I confess to a feeling of disappointment with regard to these drawings. They may be art, but they are of no value either to the gardener or botanist. Photographs of representative plants would have been more acceptable.

The number of species described in the book as having proved hardy at Batsford and Kew is forty-five. Of this number thirty-six are natives of China and Japan, one of the United States, five of the Himalayas, the other three being of doubtful habitat. These are all distinct and not difficult to recognize after a little practice. They present considerable variety in thickness and height of stem, size, color and form of leaf and in their manner of growth. Most of them grow with astonishing rapidity and are evergreen even through severe winters. The only drawback Bamboos have is in the somewhat shabby appearance assumed by some of the sorts in April and May, the result of the trials of winter. Against this, however, may be pitted the perfectly healthy appearance they wear throughout the autumn and winter, when most plants are looking their worst. There can be no doubt that Bamboos will add a considerable attraction to the garden, and as they are not particular as to soil, living and growing in gravel, or even sand, if only they can obtain a good supply of moisture, they are available for all gardens where the climate is not too severe for them. At the same time they well repay liberal treatment in regard to soil and manure. All the species described by Mr. Mitford "have stood through four winters and twenty-six degrees of frost, and they have resisted an even more deadly enemy than frost in the droughts of 1892, 1893 and 1895. . . . As for *Phyllostachys nigra*, *nigro-punctata*, *Boryana*, *Henonis* and *viridi-glaucescens*, they simply laughed at the thermometer, and were as bright at the end of the winter as at mid-summer."

The following extract may be taken as a sample of the style of the author; it is also interesting as a description of his own garden at Batsford, one of the most charming, most informal and, at the same time, richest in grand effects to be seen in England:

As I write I look out upon a great rolling track of park-land studded with patriarchal Oaks that were saplings in Plantagenet and Tudor days, giant Ashes, Elms and Thorns planted in the reign of good Queen Anne. Far be it from me to introduce any change into such a scene. It is thoroughly English and perfect of its kind; no impious hand should dare to tamper with it. But farther up the hill there is a spot snugly screened from the cruel blasts which come from north and east, where, when the great Oaks and Elms, shorn of their summer bravery, are mere gaunt skeletons, there is still some shelter and some warmth. Here, amid the sparkling glitter of a Holly grove, are all manner of beautiful evergreens, rare Pines, steeping Fir-trees, Rhododendrons, Cypressess, Junipers. A tiny rill trickles over the green velvet of the rocks, with Ferns peeping out of crannies in which many an alpine treasure is hushed to rest, waiting the warm kiss of spring and the song of the birds, that, like Orpheus with his lute, shall raise the seeming dead from the grave. Tall Rushes and gracefully arching Bamboos, hardly stirred by the wind, nod their plumes over a little stream from which the rays of a December sun have just strength enough to charm the diamonds and rubies and sapphires; a golden pheasant, all unconscious of a human presence, is preening his radiant feathers by the water-side. It is a

* *The Bamboo Garden*, by A. B. Freeman Mitford, C.B. Macmillan & Co. Price, 10s. 6d.

retreat such as the fairies might haunt, and where in the bitter Christmaside a man may forget the outside world, and for one too brief hour revel in a midwinter day-dream of glorious summer.

There is much thoughtful writing upon gardening in general, as well as upon Bamboos in particular, in Mr. Mitford's book which is certain to rank with the very best books of horticultural literature.

London.

W. Watson.

Cultural Department.

The Hubbard Squash and How to Grow It.

WHEN we consider the great improvement that has been made in the quality of almost all garden vegetables during the last half century, it is a remarkable fact that the Hubbard Squash, known and cultivated nearly a hundred years ago, continues to be the most popular variety. There has been improvement in uniformity of form and color, and last fall careful inspection of a forty-acre field, grown for seed, failed to discover more than twenty-five fruits which showed any signs of mixture or of being off type. But, while the stock has evidently become more fixed in external character, there are those who maintain that it has deteriorated in the quality of flesh; that the rich, dry, sweet, chestnut-like quality which made this sort so popular fifty years ago is lost. I think this apparent loss is due to other causes than the deterioration of the stock. There are no plants of our gardens in which the quality of the fruit is so dependent upon conditions of soil and climate. Gardeners know that it is quite impossible to grow a really good Melon in cold, wet soil, and that one ripened in a cold, damp atmosphere is certain to be lacking in flavor and sweetness. The same thing is true of squashes, and to develop the nut-like dryness and sweetness they must be grown in warm, dry soil and thoroughly ripened in warm dry weather. Unlike most plants of the garden they will produce more fruit and of a better quality on plants of moderate vigor of growth than on those of rapid and rank growth. Again, Squashes, like Beans, are more benefited by applications of potash and phosphoric acid, but are unlike the legumes in seeming to get much good from these elements when in a comparatively slowly soluble form.

To grow good table squashes, then, warm, dry, moderately rich soil should be selected and cultivation be begun as early in spring as possible. A liberal dressing of wood ashes is necessary, a full bushel to the square rod being as little as should be used. Just before planting, which we do about the 20th of May, the ground should be plowed and harrowed and marked out for hills about ten feet apart each way. At the intersections a handful of guano, hen-manure or superphosphate should be scattered, and also one of fine ground bone-dust or flour. Thoroughly mix this with the soil for a space two feet in diameter and plant from twelve to twenty seeds, scattering them well, as in this way one or two plants can often be saved from cutworms and striped bugs, which would have destroyed all if the plants had been close together. We do not know of any certain protection against the striped bug. Dusting with wood ashes, with lime fresh slacked, with a little sulphur, sprinkling with dilute gas-tar water, or with liquid manure made from fresh hen-droppings, are each more or less effective and will sometimes seem to keep the insects off, but at others utterly fail to do so. My advice is to use any or all of them. The lime and ashes should be diluted with bran and plaster, or, better still, with tobacco dust; if used abundantly there is danger of killing the leaves with strong alkalies. As soon as the large squash bugs appear they should be trapped under pieces of board or shingle laid near the plants and examined in the cool of the evening when the bugs will be found hiding on the under side and can be easily caught and killed. Give as little cultivation as possible, only enough to keep the ground clear of weeds, and the surface broken after heavy rains. When the plants are well started thin out, leaving two or three to each hill, and when these are three to four feet long remove the surface soil under a joint twelve to eighteen inches from the root. Press the vine down into it and fasten it, so that the stem will arch up between this point and the root and cover with earth. If the soil is at all dry water thoroughly, covering the wet surface with dry earth. The vine will make root from the buried joint, and in this way it will often escape death from the borer working at the collar.

In spite of all claims to the contrary, I am certain that the quality of squashes is often affected by the fertilization of the flowers with pollen from some inferior stock. In garden cul-

ture it is quite feasible to prevent this by going over the patch at evening and preventing the female flower, which would naturally open the next morning, from doing so by tying the tip of the blossom, and treating a few male flowers in the same way. About nine o'clock the next morning pick the male flowers; carefully tear away the corolla and fertilize the opened female flowers by dusting or rubbing some of the pollen from the male flower over the pistil, then closing and retying the female flower. While there will be failure to accomplish the purpose in some cases, enough self-fertilized fruits can easily be secured for a full crop, and any others which may appear can be cut out. As the fruits mature they should be protected from the sun unless they are well shaded by the leaves. When fully ripe, which may be known by their developing a shell so hard as not to be easily penetrated by the thumb-nail and by the part resting on the ground turning to a rich yellow, they should be gathered and stored in an open building until there is danger of freezing. In gathering, care should be taken not to break the stem of the fruit, the vine being cut instead, and also not to injure the surface.

Grown and treated in this way the Hubbard Squash will be found to have all its old-time excellence. The causes of inferior quality are that it is grown in too rich and wet soil; late sowing, so that it does not mature until cold wet weather sets in; and leaving the fruits on the vines exposed to injury from hot sun and cold nights after maturity.

Detroit, Mich.

Will W. Tracy.

The Rock Garden.

THE rock garden grows in interest every day as one after another the plants come into bloom. In looking it over this season we find an unusual number of self-sown seedlings. Many of these are in themselves desirable plants, but their number must be reduced or they would make a weedy effect. *Campanula Pallasii* needs thinning out. It is a handsome biennial, and effective when properly placed. Here it borders a natural shrubbery, and being aggressive takes possession of the ground beyond the limits allotted to it. When it extends into the shrubbery, along with some Sunflowers, *Helianthus lævis*, we do not object, but outside these limits it must be weeded out. *Papaver nudicaule* comes up everywhere, but it is so graceful that we let it grow quite freely. It is short-lived, and hundreds of the plants die every year. There are plants in all stages of growth—some in bloom now, and seedlings to bloom in the autumn. Some hybridization has been effected with the *P. alpinum* form, so that now we have white and several shades of orange, and some have become double. A double Iceland Poppy is not, however, to be regarded as an acquisition.

Viola cucullata is taking up too much space. In spring-time it is a hard matter to root the numerous tufts of attractive purple and white flowers. Gray's *Manual* says of this *Viola*, "flowers rarely white." All our plants were originally the variety *cucullata*, var. *striata*, and it was with pleasure some five years ago that we found a pure white-flowered variety among them. Now it has spread to all parts of the rock garden, to the exclusion of the purple form, which will need artificial propagation. *Saponaria ocymoides*, formerly of the variety *splendens*, has so far retrograded that it is now a weed. The beautiful *Heuchera sanguinea* fails to come true from seed, freely hybridizing with the commoner *H. Americana*. *Aquilegia Canadensis* seems to have improved by contact, probably with some of the early-blooming *cœrulea* hybrids. We have some purple ones among them, but it is hardly probable they are hybrids with *A. glandulosa* or *A. Bertoloni*, *A. Olympica* possibly. *Alyssum Wiersbeckii* has spread itself agreeably. It is the brightest and best of all. Its long-branched spikes of bright yellow flowers are delicately fragrant and make a handsome bouquet in themselves. Tufts of *Iris graminea*, var. *hæmatophylla*, occur in pleasing contrast with the large Rock Cress, *Arabis albidia*. *Iris verna*, with lavender and yellow crested flowers close to the ground, is really pretty, and is at the same time one of the few fragrant kinds. We were pleased to find an uncommonly pretty and scarce British scurvy grass, *Cochlearia Anglica*, come through the winter in good condition. It was the first plant to flower, excepting the *Chionodoxas* and *Squills*, and was nearly a week ahead of the Rock Cress. The flowers are pure white in dense tufts, looking neat for a while, but it will evidently, like many other plants of this character, look ragged later, and end itself in going to seed. The same happens with *Iberis Tenoreana*, one of the handsomest of rock Candytufts. It is also tender, and with lessened vitality in producing seed it seldom goes through the second winter. We secure it by taking a few cut-

tings. We are on safer ground with native plants. *Mertensia Virginica* takes care of itself, and is not likely to become obtrusive. Its life above ground is short, being past, leaf-stem and all, by midsummer. Its nodding panicles of incomparable blue are always welcome.

Phloxes of the subulata type are the most charming spring flowers we have. Their color tones are most penetrating; a patch six by six feet, of the old variety *atropurpurea*, will catch one's eye from a hillside half a mile away, while *P. reptans*, an equally handsome kind with colored flowers, will scarcely be noticeable at that distance. *P. reptans* grows nearly one foot high with us, and the stems are long enough to pick. *P. subulata* Sadie is an American-raised sport from the common white Moss Pink. It is lavender-blue and unique among the true subulata type. It is thrifty and early, always fresh and green, whereas many of the imported varieties get winter-burned.

Rosa Wichuraiana, the so-called Memorial Rose, is badly killed, but there are plenty of live shoots left to cover the ground anew. *Megasea purpurascens* and *M. cordifolia* have also suffered severely. They are naturally evergreen, and when their winter coat of leaves is lost new ones must be made at the expense of the old root. Under such conditions the *Megaseas* will be gone in a few years. *Campanula garganica* looks fresher than ever.

We have introduced strangers to our rock garden who expected to see statuary and fountains, and others who thought we should arrange it in beds or tiers of pockets as more convenient to get at. The garden is wild and without labels, and is as natural-looking as any other bit of bank. It is hard, however, to get the names grounded into one's memory, and fresh additions every year increase the difficulty. Apart from the rock garden proper we have a piece of wild garden along a sheltered slope. It is in part shaded by sparsely planted Oaks, and grassed over to be kept green, but not to the extent of a trim lawn. Many beautiful plants can be introduced here. Native plants and such as could be mown over with a scythe without injury are desirable. There are enough to make a lovely spring picture. Blood-root, *Sanguinaria Canadensis*, *Mertensia Virginica*, all the Subulata Phloxes, Violas, *Aquilegia Canadensis*, *Silene Pennsylvanica*, *S. Virginica*, *Anemone nemerosa*, *A. deltoidea*, *A. ranunculoides*, *Erythroniums*, *Thalictrum anemonioides*, *Claytonia Virginica*, *Trilliums* of several kinds, *Mularias*, *Hypoxis*, *Blueets*, *Decentra Canadensis* and many others should be included.

Wellesley, Mass.

T. D. Hatfield.

Notes from the Arnold Arboretum.

PLANTS of *Amelanchier oligocarpa* which were obtained from the mountains of New Hampshire are the earliest of the Shad-bushes to flower here, and they are really among the most pleasing of dwarf American shrubs. In its native habitat this *Amelanchier* is rarely more than a foot high, and when grown carefully on good soil it does not exceed two feet in height. The young leaves as they open are tinted red, something like those of the large forms of *A. Canadensis*. The bark when bruised has the peculiar odor of the Wild Cherry, which I have not observed in any other species or variety of *Amelanchier*. Another fine *Amelanchier* is called, I believe, a variety of *A. Canadensis*, and known as *spicata*, and sometimes *rotundifolia*. If not a good botanical species, it is certainly a very distinct plant for garden purposes. It comes into bloom late, and is just now, May 12th, in its prime, when the others are all past their bloom. As grown here it is a low dense shrub, which produces snow-white flowers very freely.

Nurserymen who are looking for new things would do well to get a stock of these on their own roots, or if they would graft them from two to four feet high on some good Thorns they would set plants which would be genuine novelties for the shrubbery. Some of the low-growing *Prunuses*, too, ought to be looked after. *P. pumila*, which rarely in its native state exceeds a foot high, although it becomes larger under cultivation, is a beautiful plant on its own roots, and so are *P. maritima* and *P. Alleghensis*, but if they were grafted as standards on *P. Americana* or *P. Myrobalana* they would make neat, compact-headed plants, which certainly would be novel, and, no doubt, useful in shrubberies. *P. incana* is the most ungainly in habit of any plant in the whole family, and yet, if it could be in any way made into a shapely plant, its pinkish purple blossoms, which come in clusters, would be greatly admired. The first of the Apple-trees to come into bloom are the varieties of *Pyrus baccata*, with blossoms of all colors, from pure white to deep crimson. Among the newer forms of *P. spectabilis* the variety *Riversi* is strikingly beautiful this year. It is completely covered with its sweet-

scented, double, rose-pink flowers. The habit of this spectabilis group may also be called fastigiate, as compared with the generality of Apples, and they do not begin to flower as early in age as some of the other kinds of Apples, but they make up for this by persistent flowering afterward, for there is seldom a year when they do not bloom profusely.

Complaints are made that *Daphne cneorum* is doubtfully hardy, and it is true its foliage often burns in exposed situations in winter-time, but if the plants in autumn are furnished with a scanty covering of hay or dry leaves the foliage will keep bright all winter and they will come into blossom in early spring. The delicately scented pink flowers of this prostrate plant have been abundant here for a week or more. The Redbuds, as usual, opened with the flowering Dogwoods, and it cannot be too often said what a fine forest border or background to a shrubbery these two trees make at this season. One of our native Honeysuckles, *Lonicera cœrulea*, is just coming into flower. It is a neat and pretty shrub, not only on account of its lemon-colored flowers, but on account of its good foliage and the bright blue berries which follow. Just now the *Rhodora* is in its prime, and it is to be regretted that so good a dwarf shrub should be so neglected in landscape work. It certainly would fill an admirable place in connection with the *Andromedas* and *Leucothoës* when planted near the water. Perhaps it is youthful associations which make these plants so pleasing, but every boy brought up in the north where there was a peat meadow must know these flowers, and his memory will be stirred by sight of them.

Arnold Arboretum.

Jackson Dawson.

Flower Garden Notes.

THIS is one of the most interesting parts of the year in the garden, even with the extreme heat and dryness of this particular season. April showers have this year been very rare and are sadly needed.

The show of Apple-blossoms at this time is the feature of the country where apples are grown in quantity, and as a flowering tree alone it has few equals. The flowering Crabs are, perhaps, quite as pleasing, with more variation of coloring, and for this reason are finding favor with planters. There is a set of some ten kinds in flower here. They are beautiful planted in a large crescent-shaped bed, the ground being covered with late-flowering Tulips, the Parrot, *Gesneriana* and Darwin varieties mixed. The combination of Tulips is extremely beautiful now, when the early border kinds are all past. A little later the Oriental Poppies that are planted between will come on and give a second display, and when the Tulips are dying down Zinnias will be planted over them for a late summer effect. We thus get four distinct displays from the same bed with only the annual planting of the Zinnias. This plan is, perhaps, adapted only to beds of large size, so that there is a mass of color in its season.

Lily-of-the-valley is now in full bloom, much earlier than usual, owing to the heat, but the flowers are not so fine as in some years, because of the lack of water. If care is taken to thin them out every three years or so it is surprising how much better they will grow than those forced under glass in winter, provided the best variety of crowns are planted, such as are used for culture under glass.

Hardy Primroses are not esteemed very highly, and it is a question if there are any species that are to be regarded as proof against the severity of our winters. With a little protection some will prove very satisfactory at this season. A few hundred of the garden *Polyanthus*, raised from seeds a year ago and grown all last summer in shade under the Elm-trees, are a beautiful show at present. All the gradations of color in yellows and reds, mixed together with none that clash, make a very pleasing effect in a shaded position. Last fall, just before frost-time, a covering of straw about six inches thick was placed over these plants and removed early this spring. This is all the care taken, besides seeing that plenty of moisture was provided during the growing period. *Primula Sieboldii*, the Japan Primrose, is now at its best, treated in the same way. We find this useful for cutting, the erect stiff stems being better than those of the *Polyanthus* when grown under the same conditions. It is deserving of much wider cultivation. I do not remember to have seen it elsewhere, and it is usually regarded as a tender spring-flowering plant, but is hardy enough to stand out over winter, with covering. The typical *P. Sieboldii* is a rich, deep rosy purple color and is the best variety to grow, though there are numerous other kinds, some called white. But there is not the purity of color one would expect, and the same remark applies to the many other varieties of *P. Sieboldii* in commerce, the type being still in

advance of the "improved" varieties. There is also a set of double Primroses, common in English gardens, the colors varying from rich deep red to lavender, yellow and pure white. We have never been able to get the red-flowering sort, but we have the other colors and grow them in quantities in frames for early spring flowers, treating them the same as Violets. They have proved as hardy as the Polyanthus during the past winter and quite as satisfactory in the open border, under the same treatment. These are true Primroses, having one flower only on each stem, this being the point in which they differ from the Polyanthus or many-flowered Primrose.

All the yellow-flowered Narcissus are past, and we have only the Poet's varieties left, but these are very beautiful now, planted in the grass under Apple-trees in an orchard. This is the proper place for the stellate-flowered kinds, without doubt. Not only are the rich borders unfitted to them, but the flowers to be seen at their best need a green setting such as the grass affords, and under trees the grass is thin and is allowed to grow until hay-time, when the Narcissus have about matured their foliage, and may be cut off without injury to the bulbs. All of the Poeticus section, also Barrii, Leedsii and incomparabilis are eminently adapted to this mode of culture, and I am not sure that some of the large yellow Trumpet kinds would not do better under this system, but this is a matter for further trial. Some Narcissi dwindle away and some thrive in rich soil. Those that disappear probably have good reason for doing so, and it is fair to assume that, provided they are hardy, it must be from uncongenial soil.

Mertensia Virginica has been beautiful for two weeks past, and is still as blue as the Myosotis. It is one of the best spring flowers we have, and as a companion for it may be recommended Corydalis nobilis, the noble Fumitory, a near relative to the Dicentras, with foliage similarly cut, and large clusters of flowers of bright yellow, with dark brown centres. It is a difficult plant to transplant, owing to the nature of the root-stock. Any one who has moved roots of the old Bleeding-heart will remember the half-decayed state of the thickened roots, and the same peculiarity applies to Corydalis nobilis, so much so that it takes a year or two for the plants to fully recover from a removal. But it is a valuable plant for spring blooming and a fitting companion for Dicentra eximia, the best form of this being now in full bloom. It is one of the best native plants we have for the open border, though it comes from Tennessee and Georgia.

Trollius Europæus and T. Asiaticus have proved so well adapted to this climate that a trial of the other cultivated sorts has been made, and a complete set of those grown in European gardens were obtained last year. These are now in bloom, with the exception of T. patulus and its white variety, the plants of which did not live. The double T. Japonicus is a real gain, owing to the brilliance of its orange-yellow color, and so is T. napellifolius, which is a fine large flower, but the improved garden forms sent are no better than those raised here from seed of T. Europæus and T. Asiaticus, and are not so well suited to our climate. It is desirable when a good form from seedling plants appears in the garden to save seed from it. Plants raised in this way often have exceptional value, and some of the best globe flowers we now have we secured by this means.

Pæonia Wittmanniana is now in flower. It comes in before P. tenuifolia, and has single cup-shaped creamy white flowers, with abundant yellow anthers and traces of purple at the base of the cup. It is interesting as a species, and also on account of its early flowering season. P. tenuifolia will be in bloom in a day or two, and there are few more desirable garden plants than the early-flowering Pæonies, including the tree varieties, and they come at a season when there are no rosebugs to devour them.

South Lancaster, Mass.

E. O. Orpet.

Carex Japonica variegata.—This is one of the most elegant of the dwarf Grasses and is perfectly hardy in this latitude. The narrow leaves are twelve to eighteen inches long and deeply channeled, and vary in color from nearly pure white on poor soil to those with interlinings of white and green on more generous nourishment. It flowers in April or May on triangular stems, which are long and pendulous and scatter the abundant golden pollen in every breeze. But the plant increases rapidly by underground shoots. It is especially desirable for a front row in the border, and would be very attractive in a greenhouse if grown in shallow pots for decorations.

Allium Margaritanicum.—This is a rather uncommon Onion from Asia Minor, which is a distinct and hardy species well suited to the rockery. Its rounded leaves are about six inches high and the flowers are clustered in a globe of about an inch diameter, forming a hairy-like white ball. Like all the hardy

Alliums this species seeds freely and will maintain itself under adverse conditions.

Elizabeth, N. J.

J. N. G.

Correspondence.

Why do Blossom-buds Winter-kill?

To the Editor of GARDEN AND FOREST:

Sir,—In your issue of May 6th, Mr. Willard is quoted in a note as saying that the failure of the plum crop proves that the fruit cannot endure a temperature of twenty-two degrees below zero. Mr. Willard has had more experience than I, but it seems to me that he is only considering one of the factors in hardness of plants. The fact that fruit does not endure a certain degree of cold one winter is no proof that it may not endure even a lower degree under different conditions.

Here, we ordinarily think of fourteen or fifteen degrees below zero as fatal to the peach crop, and as we often have a lower temperature than that but few Peaches are planted. During the winter of 1894-5 the thermometer several times ranged below twenty, and once sank to twenty-five below zero, and yet only half the Peach-buds were killed, and the trees produced a good crop the season following. Last winter, with a minimum temperature of only five degrees below zero, fully one-third of the Peach-buds were killed. I do not know just what conditions made the buds more hardy one season than another, neither do I know why part of the buds on a tree should be more hardy than the rest. Even in the axil of the same leaf one bud may be killed and the other live.

Other organic substances show the same differences. In a half-bushel basket of potatoes exposed to the cold in a cellar, I have often found frozen tubers scattered through the basket and the rest not frozen. In the blossom-buds of the Cherry and Plum one or more may often be found killed, while the rest have escaped.

When we first began to spray our Peach-trees to prevent the fruit from rotting, the Bordeaux mixture used was not properly prepared, and as a consequence a large part of the leaves on the sprayed trees fell off prematurely. The next spring it was found that there was a larger proportion of live buds on the trees from which the leaves had fallen than on the rest of the same variety. My explanation at the time was that the buds become less hardy in proportion as they are more developed. We know this is true in the spring. The question at once arises, at what stage in the development of a bud is it the most hardy, and how can we best control that development? This seems to me a promising field for some careful study.

Illinois Agricultural Experiment Station.

G. W. McClure.

A Destructive Scale in the Marquesas Islands.

To the Editor of GARDEN AND FOREST:

Sir,—Mr. Craw sends me part of a Cocoanut-leaf and a leaf of some tree called "Vee," from the Marquesas Islands, thickly infested by a scale insect. He received the specimens from Mr. J. Wilkinson, of Tanata, who reported the insect as very destructive, remarking that "it breeds faster and attends to business better than anything else in our little world." The scale proves to be the *Aspidiotus destructor* of Signoret, described in 1869 from specimens received from the island of Bourbon, where it was very destructive to Cocoanut Palms, and also infested Guava and other plants. In 1891 Maskell recorded it on Cocoanut in the Laccadive Islands, and I have shown that it is common in the West Indies. Mr. Wilkinson thought it had reached the Marquesas from California or New Zealand, but it is not known in either of these localities. Care should be taken that it is not introduced into southern California or Florida.

Agric'l Experiment Station, New Mexico.

T. D. A. Cockerell.

Recent Publications.

The second part of the botanical series of the publications of the Columbian Museum of Chicago contains an account of the plants of West Virginia, by C. F. Millsbaugh, curator of the Department of Botany, and Lawrence W. Nuttall, prefaced by a short account of the topographical and climatic features of the state, its botanical history and an account of the special features of the flora. Two thousand five hundred and eighty-four species, varieties and forms of plants have been detected in the state, including more than a thousand species of Fungi and Lichens, and

1,309 species of flowering plants. It is claimed that West Virginia contains a greater amount of hard-wood timber in its forests than any other state, and the authors are convinced that "nearly or quite two-thirds of the state remains uncleared, and by far the greater portion of the uncleared land is still in virgin forests, where the axe of man has never found its way, and where magnificent specimens of forest growth stand thickly side by side and reach a towering height, no finer view of standing timber may be had within the confines of the Union. These splendid forests, covering over sixteen thousand square miles, yield nearly every species found in the north. Here trees grow to such size that ordinary methods will not suffice to handle them, and are frequently so densely compact that the light of day scarce penetrates their shade, and pathways must be cut before the axemen can find room to work." Among the principal timber-trees enumerated are the White Ash, the Beech, the Black and Yellow Birch, the Lindens, the Chestnut, Wild Cherry, the Hemlock, the Hickory, the Sugar Maple, the White and Chestnut Oaks, the White Pine, the Red Spruce, the Tulip-tree and the Black Walnut.

Notes.

More than ten thousand cases of apples reached the London market on a single steamer on the second of May from Tasmania. Permain and Ribston Pippins were reported of the first quality and evenly graded, and brought at wholesale from \$2.50 to \$3.25 a bushel, and a small quantity from Victoria brought \$4.50.

New potatoes are coming from as far north as Georgia and South Carolina, as are cabbage, string-beans, beets and carrots. New beets are also coming from Louisiana, and the first peppers of the season from that state arrived last Saturday. Peas from Maryland are in the markets, the bulk of supplies of this vegetable coming from Virginia. Cucumbers, from glass houses near Savannah and Charleston, are offered with field-grown stock from Florida. From near-by points, grown under glass and in the open, are new onions, lettuce, cauliflower, beets, sorrel, dandelion, kale, spinach, rhubarb and radishes.

Huckleberries of good quality, from North Carolina, may be had in this city for thirty cents a quart. The first blackberries, from the same state, were offered here two weeks ago, but these were small and not desirable. The first Peento peaches from Florida reached New York last Saturday and are now selling at retail for \$1.50 a dozen, the price asked also for Bidwell peaches. While strawberries have been plentiful enough, those of prime quality are scarce, owing to continued dry weather. This fruit is now coming from as far north as Maryland, and Delaware berries are looked for in a few days.

We learn from Thomas H. Kearney, Jr., of the Division of Agrostology, in the Department of Agriculture, Washington, that *Buckleya distichophylla* has been collected by Master Harry Allen, near Newport, Cocke County, Tennessee, about sixteen miles below Wolf Creek, so that its known habitat is greatly extended. It will be remembered that *Buckleya* is one of the rarest of North American shrubs. It was described and figured in this journal, vol. iii., page 236, and on page 168 of the present year Mr. Kearney gave an interesting account of its discovery at several points near Paint Rock, which for many years was considered the only place where it was found in a natural state.

A protracted drought so early in the year as this is phenomenal, but all the country hereabout is now suffering for lack of water. When pasture-fields in the middle of May look as brown as they do in August, and there is no grass growing in the meadows, and even the Plantain leaves are curling up on the lawn, the outlook for the farm and garden is not promising. The extreme hot weather forced flowering plants into bloom earlier than usual, but the flowers came all at once when they should have been spread over at least a fortnight. A forced growth is always feeble and the flowers lasted but a little while. The season of Tulips and Daffodils was never so short. Meanwhile, vegetable seeds lying in the ground, which is almost dust-dry, show no signs of germination. These droughts, which now seem to come every year at one season or another, are so destructive that no garden is safe without some appliance for irrigation.

A correspondent in writing of the Flower Carnival in San José, California, which was one of the earliest towns in the northern part of that state to revive the old Spanish custom, says that the town was filled from the sixth of May to the ninth with great crowds from every direction. More than one hundred acres of flowers had been planted in vacant lots about the town and cared for by the organization which prepared the pageant, and, besides these, car-loads of material were brought in from other places, and the entire Santa Clara valley was laid under contribution for flowers used to decorate the innumerable floats and vehicles which made up the grand parade or to be strewn about lavishly in this Battle of the Roses. The streets were decorated with arches and the houses with flowers and boughs of Douglas Spruce and Redwood, while the gray moss which streams from the White Oaks was largely used in mural decorations. The procession was three miles long, and some of the floats were considered wonders of art. Among the leading participants were the school children from the city and other points in the valley, each school competing for a prize for the most beautiful and original design.

A bulletin lately issued by the Agricultural Experiment Station of Pennsylvania gives an account of the phosphate deposits in Juniata County which were discovered last year. It has long been known that there was a narrow belt of unusually fertile soil along the two central ridges of this county, and it was in this belt that the discovery was made. Along the outcrop of the Oriskany sandstone, between this and the overlying Onondaga limestone, is a decomposed mass of marls and sands in which the phosphate material is found. The seams lie conformably with the stratification of the country and can be easily traced. Trenches give evidence of a persistent belt of phosphate which can be easily mined, is accessible to railroad, and encloses valuable material enough to constitute an industry. The material is not of a grade equal to that of the southern phosphate, but it will bear transportation to a moderate distance. What renders the discovery of special interest, however, is the fact that almost exactly similar geological conditions exist in many parts of the state, so that there is warrant for the belief that further explorations may develop phosphate deposits in various parts of the commonwealth, and if so this may result in an important addition to the agricultural resources of the state.

In regard to the sale of American apples in England, Messrs. J. C. Houghton & Co., of Liverpool, who deal in high-grade apples at wholesale, write that early in the season fine King apples always sell well, and last year they brought as high as \$5.62½ a barrel, although this fruit generally ranges at wholesale at from \$4.00 to \$5.00. As the season advances King apples become softer, and Baldwins, which are always appreciated in the English market, take their place, in a measure, at prices of from \$3.00 to \$4.25. Greenings are usually in good demand for culinary purposes, but not being used for dessert do not command the prices paid for more attractive-looking red apples. York Imperials last year were in high favor, and sound large fruit brought from \$4.25 to \$5.63 a barrel. Ben Davis, Winesap and Spitzenberg are all well known and appreciated, and bring about the same prices as Baldwins. Golden Russets usually sell for low prices while other apples are coming forward freely, but in the spring, when most varieties are exhausted, they frequently command full prices, and sales have been recently made at from \$4.25 to \$5.40 a barrel. Newtown and Albemarle Pippins are regarded there as the very best American apples, and during last season they brought at auction as much as \$8.37, but when arrivals were heavy, prices ruled at from \$3.75 to \$5.25. Of course, these prices apply to selected fruit, for small and inferior Albemarle and Newtown Pippins bring less than other varieties. In fact, it is hardly worth while for Americans to export small apples to compete with those from the European continent and English orchards. Where the Americans have the advantage is in the size and color of their fruit and in the convenient form in which it is packed—that is, in barrels. Only the larger and best-colored apples of any variety should be sent if good prices are to be assured.

The death is announced of the Abbé Delavay, for many years a missionary in Yun-nan, the south-western province of China, where he made large collections of plants, discovering in one small region more undescribed species than have fallen to any other one botanical collector of this generation. Among the plants discovered and introduced into Europe by him are numerous species of *Primula*, *Rhododendron* and other plants destined to keep green the memory of this brave, zealous and indefatigable priest.

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Forest Fires—Another Lesson from India.

THE unusual drought which prevails throughout the eastern United States has made the forests more liable to fire than usual at this season, and as we write there are destructive conflagrations in the woods of southern New Jersey, western Pennsylvania, Long Island, the Adirondacks and all of the New England states. It is the same sickening story of standing timber, saplings and seedlings vanishing together in smoke, while the soil is burned to absolute sterility, or, at least, is left in a less productive condition for new forest growth. In many cases, too, fences, orchards, fruit gardens and farm-buildings have been swept away, so that the whole thing means dead loss for the present, and loss of hope for the future, without any palliation or compensating advantage. Next spring, if the weather is dry when farmers who live on the forest border begin to start their brush fires, the woods will burn again, and careless campers, locomotive sparks and the reckless tramp who owns a match will all aid in the work of destruction. This will be repeated the spring following, and so on, but it is evident that an end must come to this wanton destruction at some time in the future. Intelligent people in various parts of the country are coming to understand that the loss of the forests is not simply a loss to their owner, but a loss to the community. The legislatures of different states are enacting laws which, if properly enforced, would protect the woods. States like Maine and Minnesota have taken the lead in this legislation, and if the laws would enact themselves there would be few more forest fires. But, as we have repeated over and over again, what is primarily needed is an educated public opinion. As soon as it is generally understood by the people who live near the forest that it is as truly to their personal interest to stop a fire in the woods as it is to stop a fire in their own buildings there would be good laws, and these laws would be enforced.

This we have asserted often, because the statement is based on reasonable grounds, but we never realized to the full that it had been demonstrated on a large scale until we carefully read the paper by Mr. Ribbentrop, to which allusion was lately made on page 191. Under the sway of the Mohammedans in India, the wandering tribes fired

the forests year after year to provide grazing grounds for their growing herds of cattle. Under the British rule the herds multiplied and new areas were cleaned by fire. The woods were everywhere looked upon, as they were in the early history of this country, as barriers against progress, obstructions which must be swept away to make room for profitable agriculture. At last it began to be felt in India, as we are beginning to feel here, that wood is worth something. The Government began to realize that large portions of the forest area in the Indian Empire would be burned unless special measures were adopted for their protection. Fifteen thousand square miles were set apart for special patrol and protection in 1883. Twice that area is now protected, and the rest of the forest which is not under this special care has secured much greater immunity from fire. The protected areas include not only the ever-green woods, and those which in marshy regions are self-protected, but large areas of dry forests which were formerly subjected to yearly or, at least, to oft-recurring conflagrations. Besides this, fire is kept out of the comparatively unprotected woods, and this is largely due, according to Mr. Ribbentrop, to the spread of knowledge among the agricultural population. Their growing interest in the protection of the woods has led to a careful use of fire in their vicinity.

The Indian Forest Department has thus proved clearly that it is possible to protect large forest areas from fire even in the very driest climate by a well-considered system of patrol, and their experience has also proved that the example set by Government has caused the agricultural population to pay a greater respect to forest covering. Of course, in this country, where labor is comparatively scarce and dear, a system of forest guards will be more expensive, but, on the other hand, the education of the people is much higher than it is among Indian peasants, and, as Mr. Ribbentrop well says, "the feeling of the people in respect to a conservative forest policy has more to do with successful fire protection than any number of fire-breaks and watchers." No doubt, the way to begin to protect forests is to pay for their protection. No scheme for voluntary help is trustworthy. Strict laws are necessary and the enforcement of them requires men and money, but this will be the cheapest process in the long run, for the people will soon learn to be careful how to use fire in the dangerous neighborhood of forests, and they will soon be helpful in enforcing the laws rather than harmful in opposing them.

SINCE the above was written we have received a circular issued by the Forestry Division of the Department of Agriculture, which discusses the question whether protection against forest fires is practicable, and the answer is that although these fires cannot be altogether prevented by any system, there is abundant experience on this continent to prove that it is practicable and simple to protect large forest areas against fire, and that it is practicable to burn the debris of the lumbermen's chopping, and to do both cheaply. In support of the first proposition the report of the Commissioner of the Crown Lands of the Province of Ontario for 1895 is quoted. Here a system of fire-ranging is established under which a number of men are enlisted from May to September wherever there is special danger. The men who own licenses to cut the lumber, and who are, therefore, interested and who are familiar with the topography, are allowed to nominate the men employed, the Department reserving the right to reject or remove any one who neglects his duties. These rangers put up posters containing the fire act throughout the territory under their charge and hand the laws in pamphlet to settlers, so that everybody becomes familiar with their provisions. They are authorized to employ assistance when the fires break out, and when these assume dangerous proportions they are required to notify the Department and the licensee, so that both may be represented. The Department bears half of the expense, and at the end of the season, diaries, with sworn accounts and reports on the fire losses, etc., are sent

in. Last summer was an exceptionally dangerous one, being the driest for years, and yet owing to this close supervision no large destruction of timber took place, and altogether the service has proved admirably adapted to accomplish the end for which it was established.

On the second point a large firm of lumbermen in Michigan testify that they always burn the debris from their operations in the fall or spring when the ground is damp, and the wind is in the right direction, so that the fires will not spread. This has proved perfectly successful, and for years they have not suffered from any destructive forest fires. The open chopping dries out more quickly in the spring than the neighboring timbered land, consequently the fire burns in the open and stops as soon as it comes to the woods. Only common sense and ordinary judgment are required to point out the proper time to burn the choppings and thus remove a menace to uncut timber. These lumbermen consider this burning over a good insurance, and the cost is so trifling that it would be criminal carelessness on their part if they did not guard against losses to themselves and to their neighbors.

The cost of the protective service in Ontario was about three and a quarter cents a thousand feet, while the cost of burning the debris by the lumber companies was \$5.00 a square mile, or one-tenth of a cent a thousand feet of lumber cut. At this rate the cost of burning throughout the great lumbering states of Michigan, Wisconsin and Minnesota would be less than \$35,000 a year, and this would prevent losses which foot up to millions of dollars annually. If to this precaution a service similar to the one in Ontario were carried out at the same expense it would appear that for \$100,000 a year each of these states could have a well-organized service of special guards which would prevent nearly all the forest fires. To get some conception of what is really lost in these fires, and to show how insignificant in comparison to this the expenditure of any ordinary sum for protection would be, the following computation by the Forest Commissioner of Pennsylvania is quoted:

The most obvious consequences of forest fires, serious as these may be, are by no means of the greatest importance. Loss of logs, of bark, of standing timber, young and old, of fences, and occasionally of buildings, is not less than a million of dollars annually to this commonwealth (Pennsylvania). The indirect or the consequential damage to the state is many times greater. In fact, it is so great that it appears incredible until a careful study of the whole subject is made. For example, it is fairly within bounds to assert that if all the unproductive land now vacant and uncared for within the limits of the state were protected from forest fires for, say, forty years, the timber then growing would be worth not less than \$1,200,000,000. Now, it would seem that if this growth were destroyed by fire when but a year old, the direct loss to the commonwealth would be absolutely unimportant. The same might be said if we were to see it destroyed at two, three, four, or even five years of age. But when we remember that in burning these seedlings which are but a year old we destroy a crop which, in point of time, is one-fortieth of its way on to a money value of \$1,200,000,000, the damages, if expressed in figures, must equal not less than \$30,000,000 as the loss to the commonwealth.

Shrubs, Native and Foreign.

CONTINUING our remarks on the effects of the winter on trees and shrubs in eastern Massachusetts made in our last issue, it can be said generally that the flower-buds only of shrubs which bloom early in the season have suffered, and that, in spite of the severity of the winter, nearly all later-blooming plants are flowering profusely this season, with the exception, perhaps, of a few varieties of Rhododendrons of doubtful hardiness, which have lost their flower-buds, although their foliage is untouched. Even shrubs which ordinarily suffer in very cold winters are now covered with flowers, like the Halesia or Silver Bell Tree, which has never been more beautiful than it is this year. The variety of this plant raised by Mr. Meach in his nursery at Germantown, and already figured in this journal (vol. v., p. 535), is covered with flowers and promises to

become a first-rate addition to our shrubberies. The fact that *Fothergilla Gardneri*, which was figured in this journal last year (vol. viii., p. 445), has escaped the winter untouched, and has been loaded with its lovely white flowers, is evidence of the value of this southern shrub for northern gardens. Among shrubs which flower the middle of May, none surpasses it in shapeliness of habit or in profusion of bloom. It is one of those shrubs which grow in attractiveness each year, and which, as has already been said more than once in these columns, should be seen in all collections of hardy plants.

Rhododendron Vaseyi (vol. i., p. 377) has been covered as usual with its lovely pure pink flowers, and the value of this species in northern gardens appears now to be fully established, although in England it is said to be much less satisfactory than it is here.

All the bush Honeysuckles are flowering profusely, displaying in their flowers a considerable range of colors from deep rose to white and to clear yellow. On the whole, this is one of the most satisfactory groups of shrubs. They are all perfectly hardy, of excellent habit and neat, clean foliage; they always bloom freely, and their flowers are followed by brilliant scarlet, yellow or black fruits which cover the branches in early or late summer, when few other plants bear conspicuous fruits. Through cross-breeding and selection there is now a large number of these Honeysuckles from which the planter can select, and by massing many plants with a reference to the color of their flowers or of their fruit remarkable effects can be produced.

Among Apple-trees, our native Crab, *Pyrus coronaria*, is the latest to bloom. This is a small tree of excellent habit and large fragrant pink flowers which, as they do not appear until after the leaves have partly grown, are somewhat hidden by the young foliage. They are, however, more fragrant than those of any other Apple-tree, and the bright waxy fruit, which hangs gracefully on long slender stems, is also fragrant.

All the Thorn-trees, native and foreign, are blooming abundantly this year, and no one who has not seen a well-established collection of these trees and shrubs can form an idea of their beauty at this season or of the uses to which they can be put in the decoration of parks and large gardens. The fact that they live to a great age, blooming profusely every year, adds to their value.

Among Barberries for northern gardens not one compares with the Japanese *Berberis Sieboldii* (vol. iii., p. 249). The bright yellow flowers of this shrub contrast brilliantly with the large lustrous foliage, and this late in the autumn assumes magnificent tints of scarlet and orange. For some reason this shrub has remained rare in collections, while the less desirable *Berberis Thunbergii* has become in the neighborhood of Boston one of the commonest garden plants.

The Dauphin Elm.

THE White Elm as a street-tree is conspicuously rare throughout central Pennsylvania, and at present is probably less planted than any other native tree. Fine specimens may be found in the older streets of cities and about old country seats, yet there are many otherwise intelligent people who believe that the Elm does not thrive in Pennsylvania or, indeed, south of New England.

Some two years ago Dr. Rothrock pointed out the fallacy of this idea, which, no doubt, was developed from the fact that the tall high-branching Elm, so associated in the popular mind with New England towns and scenery, is replaced almost entirely in Pennsylvania by the type described by Dr. Rothrock* as "branching symmetrically upward and outward from near the ground, forming a large, round head, while the tips of the branches droop until they almost suggest the Weeping Willow." It is to this type most of the Elms in and near the Susquehanna Valley conform,

* *Forest Leaves*, February, 1894.

and though the finest specimens are found in low ground, as "Old Elm" at Paxtang, with a diameter of almost five feet, others like the Elm at State Street entrance to the Capitol grounds, Harrisburg, live in entirely changed conditions without evidence of deterioration. The State Street Elm has a diameter of three and a half feet, and stands in what was originally swampy land. In 1785 it was already a large tree, and was one of the landmarks in laying out the town. The land has long since been drained, and the tree has endured everything that a street-tree has to suffer, yet, in spite of escaping gas, encroaching pavements, dust, blizzards and electric linemen, is still a beautiful tree and dignifies the entrance-way it adorns.

The great Elm at Dauphin, known locally as the Seven Brothers (see page 215), also belongs to the low-branching class, and with a circumference of twenty-four feet and a spread to branches of almost a hundred feet, is one of the most notable trees in the lower Susquehanna Valley, and if a single tree probably the largest. Its local name refers to the main branches of the tree, and not to the trunk, which, if compound, is formed of not more than four boles. Those who have known the Dauphin Elm longest, however, consider it one tree, and state that they have seen a distinct increase in its size during their lifetime.

The Elm stands on the river-bank, midway between the lock of the Pennsylvania Canal and the river, at this point only a hundred feet apart. The crest of the bank is about thirty feet above low-water mark, and the tree-trunk, which extends from near the crest some distance down the sloping bank, has pronounced differences in form on the upper more protected side, and the lower side, exposed to freshets. The lowest divergence of branches occurs on the side facing the lock, where the branching begins two feet above the ground; on the river-side the lowest divergence is four feet above the base of trunk. Owing to the peculiar features of the ground and encroaching foliage of trees on both sides of the canal, it is impossible to get a good view of this remarkable tree when it bears its great canopy of leaves. Through the summer its crown rises, dome-like, above the surrounding mass of foliage, and may be distinguished from points on the opposite shore of the Susquehanna River, here almost a mile in width.

The picturesque beauty of the Susquehanna at this point, with the bold cliffs of the Narrows below, and the wide bays of the river running inshore above, is too well known to call for any description, but the traveler by rail goes faster and faster through this part of the country, and the real Susquehanna is almost a sealed book, except to raftsmen and canoeemen, and will continue to be so unless, with the application of electricity, travel upon the canals following its course becomes once again a possibility.

The Dauphin Elm has been held in grateful remembrance by thousands of men and animals who in the more than sixty years of the canal's existence have enjoyed a brief rest in its shade, as they halted on their weary march from the mountains to tidewater. Besides this army of humble-folk, many well-known travelers passed beneath the Elm in the twenty years when packet travel was the ordinary means of transit through this part of the state, and Dickens in his *American Notes* has given his impressions of the journey.

The immediate surroundings of the Elm suggest a consideration of the present status of trees, especially those of commanding size. They appear to have no rights that any one is bound to respect, and yet there is nothing unreasonable in the idea that a tree of distinction should receive a certain amount of consideration. It is not an exaggeration to state that generally in the rural districts, the difficulty of seeing all of a tree is in direct proportion to its size. A tree of medium size will serve as a prop for spades and hoes and fence-rails, but with increase in size comes a greater opportunity to pile up, until in the case of a Chestnut whose crown and blossoms I saw last summer and supposed it to have a trunk somewhere, the visible connection between the spreading limbs and the

ground was formed of several agricultural implements, a broken wagon, some railroad ties and a stable door. The ordinary treatment of trees at present depends entirely on the point of view, and this in matters of greater importance than trees is largely a matter of condition and education. A man has an undoubted legal right to cover his own trees with barn doors, if he feels so disposed, but, with the growth of sentiments such as were expressed at the Forestry meeting recently held in Philadelphia, it is reasonable to hope that the time is passing quickly when a stately, beautiful tree, such as the great Elm, will suggest itself simply as a way station for tools, or as the party wall of a henhouse.

The photographs of the Elm and the Dauphin Chestnut (page 114, No 421, GARDEN AND FOREST) were taken by Mr. George Roberts, of Harrisburg, Pennsylvania.

Ann Arbor, Mich.

M. L. Dock.

The Flora of the California Coast Range.—II.

THE MENDOCINO COAST BARRENS.

THE rivers of western Mendocino County run a short course to the sea, the larger ones rising in a high barrier range, which, running north and south, divides the county. Their course cuts through high mountain chains clothed densely with Redwood forest. The ranges decrease in height as they approach the ocean, and in the last few miles of their course the rivers are tidal canals hemmed in by steep slopes covered with Redwood, Fir, *Abies grandis*, and western Hemlock. Groves of Alder, which here reaches its best development, are found in the few narrow bottom-lands. The underbrush is varied and luxuriant. Ferns riot everywhere, and the common Brake, *Pteris aquilana*, attains giant proportions, sometimes forming dense masses eight feet high. From the tidal rivers the steep slopes rise for half a mile and suddenly open on small rolling table-lands, locally called barrens, or, very inappropriately, prairies. These barrens, found between all the larger streams along the coast, are sometimes four miles wide, while at some points they cover only a few acres. They are all of the same altitude and geological formation and appear to be the remains of an extensive table-land, through which the streams have furrowed out their present courses.

These barrens are an interesting field for botanists, and from an æsthetic point of view most picturesque. They are slightly uneven, breaking into swales at the sides and bordered by an irregular line of forests. On the ocean side the land drops by heavily wooded slopes and gullies until the point is reached where the ocean has gnawed it away into rocky bluffs, and the skeletons of the older lands are seen in islets, rocks and reefs far out to sea. Fogs roll inland over the barrens and the air is always fresh and moist. Everywhere are masses of trees and thickets, with occasional open groves of *Pinus muricata*, the Prickly Pine, the black trunks of the trees rising fifty feet high, with scanty leaves, uneven limbs, and shrinking inland from the prevailing ocean winds, the cones of many years still clinging to them, or, perhaps, all life gone and the skeleton only adorned by the ever-persisting open cones.

In the lower areas, which are so flat that the water stands there in pools in the winter, and where the scanty covering of peaty soil above the impervious clay would seem incapable of supporting life, there are thickets almost impenetrable of the north coast Cypress, *Cupressus Goveniana*, slender, straight, cone-covered, and mingled with them the north coast Scrub Pine, equally slender and straight. When this dense growth reaches a height of ten feet perhaps a bush fire will sweep through it, leaving a denuded space or skeleton stems, and the fire which consumes the thicket opens the cones and seeds the land abundantly for another tangle. In the hard struggle for existence these little trees fruit when a foot high. Dense tracts of them stretch monotonously away in every direction. The overflow from brackish pools and from dammed springs gathers along the sides in swales with deeper soils and in small

bogs, where *Kalmias*, *Rhododendrons* and the Deer Fern, *Lomarea Spicant*, form dense masses, with a growth of *Sphagnum* in the more springy parts. In the more generous soil clean, symmetrical, well-developed specimens of two Pines are found, the broad, conical *Pinus muricata*, its dark long foliage contrasting strongly with *P. contorta*, with its delicate cones and short light green needles. *Lilium maritimum* finds a congenial home in these low swales, rooting in the clumps of Deer Ferns or *Rhododendrons*, and throwing up slender stems from three to five feet high, with dark green leaves in ample whorls and deep red tubular flowers, harmonizing well with the surroundings. Further down these swales are bordered with Redwood and other timber trees until they join the main forest which encloses the barrens.

The higher barrens are covered largely with the tiny-leaved *Manzanita*, *Arctostaphylos nummularia*, with scattered Pines and *Rhododendrons* and a few of the larger fuzzy *Manzanitas*, *A. tomentosa*. *Ceanothus diversifolius*, a low-growing sticky-leaved plant with blue flowers, a beautiful shrub when in bloom, and *C. sorediatus*, a rigid spiny shrub, not without beauty when covered with its bright bloom, are found here. The small-leaved *Manzanita*, as I saw it last February, when it was festooned with tiny bells, was a most interesting plant. Little ones only six inches high were in flower, looking like the dwarf *Ericas*, and the larger ones were masses of bloom. The plant is five feet high at its best. In the mixed growth on the borders of the swales and in the deep wood grows *Rhododendron Californicum*, the loveliest of California shrubs. In the higher heaths it is a low, many-stemmed bush with gnarled charred stumps which have survived many fires. In the wood borders it is a tall shrub; in the deep wood it is twelve or fifteen feet high, its glossy evergreen leaves suggesting those of the evergreen *Magnolia*, and the pink blossoms in this moist air are produced for a long season. Even the rough woodsmen admire it, and it is a most impressive plant, even to an unobserving visitor.

The Huckleberry, *Vaccinium ovatum*, is everywhere. Here it takes a low compressed form, while in the wood it is tall and slender. It flourishes in the fogs, and late in autumn the bushes are black with juicy berries which only feed the birds. On the borders of the woods and throughout the cleared or burned lands the wild Blackberry, *Rubus ursinus*, more properly a Dewberry, trails over the ground and drapes every stump, fallen log and bush. It is perfectly at home here and produces in profusion fruit of the largest size. It is sought by parties of campers who leave their homes in the hot interior valleys in July for a few weeks of the cool foggy air of the Coast Range, with incidental berries. The Thimble Berry, *Rubus Nutkanus*, a shrub attractive in leaf and flower and with palatable fruit, thrives in the cool wood borders. Sallal, that is the fruit of *Gaultheria Shallon*, is another edible berry which grows on a low ericaceous shrub in dense mats on the woodsides.

In the higher portions a burn will show thousands of tall yellow flowers of *Zygadenus paniculatus*; the dwarf dark purple-flowered form of *Brodiaea laxa* is not uncommon, and a little *Gentian*, with many annuals, is also to be seen. The Cypress, which when crowded is often seen in its dwarf form here, becomes a beautiful and symmetrical tree. In the rich woodland borders its slender and beautiful trunk is forty feet high and scarcely seems to taper. Younger trees of the Western Hemlock are exquisitely lovely; the light green foliage and drooping terminal branches give it a weeping effect that I have never seen elsewhere. Groves of perfect young specimens of *Abies grandis* are found in the cleared woods.

Ukiah, Calif.

Carl Purdy.

The Pitch Pine is our most cheerful tree, especially in the early year when it is full of light, in perfect harmony with the yellow earth and the spring sun, and warms the landscape with its ingrained sunniness. Yet men cut down these trees and set imported Larches about their houses.—*Thoreau*.

Plant Notes.

RUBUS DELICIOSUS.—This Rocky Mountain Raspberry, or Bramble, as it is often called, is one of the most beautiful as well as the most hardy of shrubs which bloom in May, and yet it is comparatively little known to cultivation, although it was discovered by Dr. James, the surgeon of Long's expedition, as early as 1820. This year the flowers opened the first week in May, and although the flowers of all shrubs forced into bloom by the unseasonable weather have been unusually fugacious, the long arching branches of this *Rubus* are still well furnished with a succession of the large white blossoms. These are pure white, saucer-shaped, resembling small Cherokee Roses, and nearly two inches across. The plant, when left to itself, has a low, somewhat spreading growth, and old plants assume something of a straggling habit. This is obviated by cutting back the branches after the flowering season, and it becomes a stout, well-shaped shrub, with light brown or gray bark and leaves on long slender red petioles. The fruit, which does not form abundantly here, is by no means delicious, as its name would indicate, but consists of three or four dry and almost tasteless carpels, although some improvement might be made in it by selection. The plant is best raised from seed, as it is rather hard to propagate from cuttings. Its perfect hardiness and the beauty of its flowers make it a most desirable shrub.

IRIS LUPINA.—The Wolf's Ear Iris is found in Mesopotamia and Central Asia, and is one of the introductions of recent years. Like the other *Oncocyclus* Irises, this is a spring-flowering plant, and coming from a country of rainless summers, it naturally becomes dormant soon after flowering and wakes into life again when the fall rains begin. *I. lupina* varies materially from *I. Susiana*, the best known of this section, especially in the form of the flowers, the falls being lance-shaped and the standards being oval, not orbicular, as in *I. Susiana* and most other *Oncocyclus* Irises. Like other Irises of this section, it has scanty, narrow and dwarf foliage, and the characteristic coloration of narrow veins on a ground of contrasting color. In this case the veins are purplish brown on a yellow or greenish yellow ground, a combination familiar in some *Cypripediums*, and altogether quiet, dainty and indescribable. Of course, language always fails to give any adequate description of the colors of flowers, especially when they are unusual shades of primary colors, but it is quite as impossible to describe the infinite varieties of forms which give individuality to every Iris. Altogether, *I. lupina* is well worth growing for its distinctness and beauty of form and coloring. It has flowered nicely with Mr. Gerard, who, after many experiments, has finally adopted as closely as possible the method of culture worked out by Herr Leichtlin. The rhizomes, which are reliably hardy, should be dried off a few weeks after flowering and kept perfectly dry until late in the year. These Irises are treated in Mr. Gerard's garden as if they were hardy bulbs whose leaves are not frost-proof. After ripening them up they are stored in perfectly dry earth in a cool cellar and planted out at the end of November, at which time the ground is too cool to encourage growth. Planted out in a perfectly open border, without protection, they make no growth until after early frosts are over, and if they were properly grown the previous year their flowering is a matter of course. This season they have required artificial watering, as there has been practically no rain here since March. Every one who has bought *Oncocyclus* Iris roots, especially of the new kinds and those which have been collected, has been struck by their apparent weakness, and this suggested to Mr. Gerard that it might be well to grow them on so as to secure stronger plants. The result was strong roots, but no increase of flowers, so that with his present experience he is not prepared to say that strong roots and luxuriant foliage are conducive to successful flowering. On points like this, however, it is not well to be dogmatic.

NICOTIANA AFFINIS.—This Tobacco plant has probably in most places superseded the old scentless white-flowered

species which was formerly a favorite in many gardens. *Nicotiana affinis* is a stately plant with pure white flowers with long tubes and spreading lobes, the upper two of which slightly reflex. It is a perennial, but the roots sel-

transplanted in the fall from outdoors and grown in a cool temperature make strong blooming plants in March or April, and are not only as showy and attractive as one could desire in any greenhouse, but they furnish excellent



Fig. 32.—White Elm at Dauphin, Pennsylvania.—See page 212.

dom survive the winter here. This is of little importance as it produces seed freely, which germinates plentifully in the border, and the plant is more valuable late in the year than in early summer. It is still more valuable in a cool greenhouse during the early days of spring. Young plants

cutting material, and in vases for house decoration will remain in a good condition for a week. This is owing, perhaps, largely to the fact that they escape the insect fertilization which makes them so short-lived out-of-doors.

Cultural Department.

Carnation Notes.

OUR plants intended to bloom next winter are still in pots and boxes, and will remain there until toward the end of the month. They are standing in a cold frame, and the sashes are not placed over them unless the night is likely to be frosty or rainy. Usually our stock is planted out by the middle of May. Experience has shown us that even a light frost is a severe check to plants. In the fall of the year they will stand a temperature several degrees below freezing without injury, but at this season of the year, after being brought along with fire-heat, they are in a much more tender condition, and a freezing which would have no apparent effect on them in September or October would greatly cripple the plants now. Last year we had much trouble with cut-worms. During the latter part of May they ruined a good many plants, and would have wiped out the entire lot had they not been fought persistently. This season cut-worms appear to be more numerous than ever, and we prefer to keep our young stock in boxes until they are lessened. If any of the readers of GARDEN AND FOREST can recommend a radical cure for this pest it would be a decided service to many growers. We have tried about every remedy we have heard of, but none have been successful. Paris green mixed in fresh bran and scattered among the plants poisons some of the cut-worms, but the majority avoid the poison and keep to the Carnation foliage. Lime, tobacco-dust, hellebore, etc., whether dusted on the plants or scattered about the stems, do not in the least check their ravages. Carbolic acid, mixed with water at the rate of one pint of acid to fifty gallons of water, and sprinkled with a rose-can over the plants, did not seem to be any deterrent, nor was Paris green or sulphate of copper, used in a similar way. Hand-picking with a lantern, although a slow method, if persisted in nightly is as efficacious as any remedy I know of. This season we have trapped a large number by scattering succulent leaves of Cauliflower and Cabbage among Phlox, Strawberries and other affected plants. There ought to be some means of wiping out this pest, but growers in this locality seem to be of opinion that cut-worms and rose-bugs cannot be destroyed unless insecticides are used strong enough to injure or kill the plants.

Plants in the benches indoors require plenty of water during such hot weather as we are now having. We recently gave our benches a mulching with well-rotted cow-manure, after having previously tied up the plants and slightly loosened the surface. There is no reason why good blooms cannot be had indoors until planting-time comes around again if the necessary water, stimulants and syringing are supplied. Syringing with good force on mornings and evenings of clear days will benefit the plants and keep red spider in check. Of course, plenty of outdoor blooms may be had by the middle of July from stock specially grown for summer flowering; but those produced under glass are cleaner than those grown outside, although their stems may not be so wiry.

A good deal has recently been written in the horticultural press concerning Fowler's arsenical solution as a cure for Carnation-rust. Mr. E. G. Hill, the well-known Carnation grower, of Richmond, Indiana, who exhibited some of the finest blooms at the New York Carnation Show last February, states that a one-ounce bottle of the solution mixed with eight gallons of water and applied once a week, so as to thoroughly wet all the foliage, cleared up some of his worst cases of rust after three applications given at intervals of a week, that the diseased leaves turned black, after which they were gathered and destroyed. We have tried this arsenic cure on a few affected plants of Rose Queen and Daybreak, but cannot see that it has checked the disease, and the leaves have not become discolored. We experimented with the solution in different strengths and find that by applying it at the rate of one ounce to two gallons of water the rust is apparently killed after two applications. As a further experiment we tried the solution on a few plants at the rate of one ounce to one-half gallon of water and failed to detect any injury to the plants, although possibly repeated syringing with this strength might result in injury. There is no question but the dangers of rust have been exaggerated to some extent, but it is, nevertheless, the worst foe the Carnation grower has to fight. We have tried copper solutions with only a moderate amount of success. I believe a great deal may be done to prevent the spread of rust by cleanliness in the houses and by careful hand-picking of any affected plants when they first show the disease. But when whole houses are attacked it will not pay to use such measures, and from an experience with Fowler's solution I am satisfied that it will destroy the rust if applied somewhat stronger than Mr.

Hill recommended. It has not been claimed that it will prevent spread. A longer trial is necessary, on a more extensive scale, to thoroughly settle how far the arsenical solution is a success, but it has proved a benefit in our own case, and we feel certain, if given a fair trial, it will be of advantage to others. A good deal of labor is involved in spraying whole houses of plants so as to thoroughly wet them all, but as most private places grow only a few dozen, or at most a few hundred plants, the work can readily be accomplished.

Of last year's introductions, Alaska is likely to prove the best. It is a persistent bloomer, with a stout wiry stem, flowers of good size and form; and the plant is a vigorous grower. Eldorado, yellow, raised by Mr. Shelmire, is well liked in this locality by those who have grown it. Its flowers have brought as much as a dollar and a half a hundred at wholesale in the Boston market. It flowers more freely than Bouton d'Or, Goldfinch or Buttercup. Meteor, as a crimson, while it gave some fine flowers early in the year, cannot be classed as a prolific bloomer, and compares unfavorably with the older F. Mangold. Rose Queen and Bridesmaid were by no means successes last winter, and we purpose trying them again next year. Rose Queen burst its calyx badly, and Bridesmaid, while of a pleasing shade, did not give more than one or two flowers on each plant. Stock of these varieties was started earlier this year, and possibly by having larger plants next September the returns next winter will be more satisfactory. Nicholson has done indifferently this year, nearly every plant having died out, and this experience is common. With the introducer at Framingham it is at this time doing well, but we do not believe it will be grown much after next season in this locality. William Scott is still proving far superior to all other pink varieties and is growing and flowering better than ever before, with no sign of disease. Lizzie McGowan continues to do splendidly in this neighborhood and is grown in preference to other white sorts. A few growers near Boston still cling to Mrs. Fisher, and as a summer bloomer it is unexcelled, but it compares unfavorably with Lizzie McGowan in winter. For some reason, however, Lizzie McGowan is not well grown by some of the leading Carnation growers in this section. As a rule, their soil is light and sandy; we find it succeeds best in a heavy clayey loam.

Taunton, Mass.

W. N. Craig.

The Hardy Flower Garden.

THE month of June is the most interesting of any in the hardy flower garden, and the plants not in bloom are fresh and green. The tall Leopard's Bane, *Doronicum plantaginifolium*, var. *excelsum*, is just past its best. It is about two feet tall and quite showy, and, with the Dandelion, one of few composites in bloom so early in the season. The common Marsh Forget-me-not, *Myosotis palustris*, and particularly the variety *semperflorens*, does well in the borders, and lasts for years if it is well watered during the summer months. *M. alpestris* is earlier and more tufted, blooming densely during the early spring months. It is a perennial in its native country, the European Alps, while here it is little better than an annual, and to succeed with it a new stock must be raised every year. *Polemonium Richardsoni*, a medium-growing Jacob's-ladder, does better in a rather moist shady place than in the full sunlight, as we lately discovered. Some yellow-flowered kinds, which we did not think much of, might have done better had we tried them in shade. *Phlox ovatus* is the earliest of border Phloxes, and quite showy.

The Globe-flowers, *Trollius Europæus* and *T. Asiaticus*, are among the choicest of border plants. They are rather stately, though not tall, with neatly divided and attractive foliage. The flowers are yellow, and, as the name implies, quite globular, being incurved in the same way as a Chinese Chrysanthemum. *T. Asiaticus* is the dwarfiest and earliest, and the flowers are also a slightly deeper shade of yellow. The Day Lilies are among the handsomest of border plants, and they are thoroughly hardy. They are not aggressive, but when established will thrive under adverse conditions. I know an old cottage garden, much shaded and pestered with tree-roots, where these Day Lilies grow thriftily and never fail to bloom well. *Hemerocallis graminea* is the earliest, followed by *H. flava* and *H. Mittendorffiana*. *H. Thunbergii* is an autumn-blooming kind, and the finest of all. It has been offered many years by a leading firm, but is still scarce.

Lychnis Chalcidonica is never lost. It will grow wherever it has a chance. Its heads of bright scarlet flowers compose well in bouquets. If cut down when going to seed it will start afresh and bloom in the autumn. The Ragged Robin, the double *L. Flos-cuculi*, has lately been offered, I believe, as a specially new thing. It is an acquisition, new or old. The

charming paniced cymes of pink flowers are very effective when massed in the front line of the border. The true Geraniums, or Cranebills, are all attractive, bright and healthy-looking. Our spotted *Geranium maculatum* is regarded with favor, and where not native is cultivated. *G. sanguinea*, a low-growing European species, is in bloom from spring until frost. *G. pratense* is a beautiful plant, whether we look at its handsomely cut palmate leaves or branched panicles of purplish blue flowers.

Oriental Poppies are, without doubt, the showiest of all border flowers. Their blooms are short-lived, but gorgeous while they last. Among others we have *P. pilosum*, *P. rupifragum*, *P. nudicaule* and *P. alpinum*, with the annual varieties, *P. somniferum*, *P. Rhœas* and the Shirley Poppies.

Pæonia tenuifolia is past, *P. paradoxa* and *P. decora* are opening, while the *Albiflora* and *Officinalis* groups are one week later. *Pæonias* and German *Iris* together in bloom make a beautiful effect, as do blue German *Iris* and blue *Columbines* in a bed of Ghent *Azaleas* all in bloom together. *Dicentra spectabilis*, the Bleeding-heart, is attractive on the shady side of a shrubby border. Here it is well placed, as in an exposed sunny place it starts early into growth and is scorched by spring frosts.

Perennial Larkspurs are shooting up fast. There are numerous kinds, mostly of hybrid origin, with *Delphinium elatum* as seed parent, at least in the original hybrid. *D. formosum* is among the handsomest. *D. Sinensis* is a pretty dwarf species, which we have in blue and white varieties. In intensity of blue it is unapproached. Foxgloves make a striking show. They are most effective for the interior of shrubberies, but in full sunlight they die out quickly. Sweet Williams make a distinct display, and usually border the shrubberies. *Columbines* are abundant, but being biennial in character and coming and going quickly they are not obtrusive. Some garden varieties may run out, but *Aquilegia Olympica* is as good as ever, and *A. Canadensis*, we think, has improved. I recently noted purple forms, and to-day I find one with clear yellow flowers, excepting only purple spurs; in every other respect it is of the *A. Canadensis* type. In addition to German *Iris*, we have *I. tenax* and *I. oxysepala*, neat native species with attractive mauve-colored flowers. *I. oxysepala* is sweet-scented.

Wellesley, Mass.

T. D. Hatfield.

Tree Pæonies.—These are among the most uncertain of flowering plants in latitudes exposed to even moderately late frosts. They are perfectly hardy, and even if they sometimes unfold their leaves early these are seldom injured by ordinary spring cold, but there seems to be a critical time in the growth of the plants just after the unfolding leaves expose the flowering buds. At that time these buds seem to be very tender, and a slight frost or even a sudden check some day from a low temperature seems enough to prevent their further growth for the season. The time during which the buds are so sensitive appears to be short, and it will sometimes be found that buds which have been exposed a day or two later than others escape damage. To flower these plants with certainty it is evident that we must take care to furnish temporary protection for a few nights when the buds are in this tender condition. There is some difference in time of moving of the Moutan Pæonies, and the only flowers we have this year are on *Gloria Belgarum*, and this exception is, perhaps, due to the fact that they unfold later than the others. A well-grown Tree Pæony with fine flowers is one of the most beautiful of garden plants, but one seldom sees in cultivation varieties which are comparable in beauty to the modern herbaceous kinds. A few fine single-flowered kinds have been introduced from Japan in recent years, the best of these being the white-flowered ones, which are sometimes pure in color and sometimes tinged with pink in the centre. With their golden stamens, and often fringed petals and glaucous foliage, they are the perfection of form and coloring. But if I were to grow but one Moutan Pæony it would be *Reine Elizabeth*, a splendid flower, very double, of a very pure salmon-pink color, deepening toward the centre, and of enormous size. Fortunately, it is not a rare plant, but it requires, like all Pæonies, a generous treatment and a few years of vigorous growth to make a good specimen. *Gloria Belgarum* is much lighter in color, an enlarged form of the ordinary light pink type.

Elizabeth, N. J.

J. N. G.

Shrubs and Climbers Winter-killed.—Though the past winter was not extremely cold, its effects upon some shrubs and climbing plants in this locality have been very disastrous. We had less snow than in any winter in the recollection of the oldest inhabitant, and, no doubt, this was one reason for the unusual number of fatalities. One of the oldest of the college buildings

has been well clothed for years with *Ampelopsis Veitchii*, and last summer this was in perfect health; now not more than one-third of the plants are alive. All the plants in a large bed of *Diervillas* planted three years ago in a moist situation, and uncommonly vigorous last summer, are now killed to within a foot of the ground, while others on higher and drier ground suffered less severely. Some nice bushy plants of *Magnolia Soulangeana* are killed back almost to the ground. *Itea Virginica* shared the same fate. A fine specimen of *Chionanthus Virginica*, standing in a very exposed position, has only barely escaped; it is now just starting into growth, while others in more sheltered locations are in flower. Some old specimens of *Rhus Cotinus* have suffered severely where exposed. Many of the evergreens are also badly browned. Last summer was an exceptional season for growth. Some of the *Magnolias* made shoots over four feet in length, and other shrubs in proportion. But the new wood did not ripen and could not withstand the cold. All the shrubs named are considered perfectly hardy here.

Solanum citrullifolium.—This *Solanum*, one of the annual species, is now flowering in the greenhouses here. It grows to about one foot in height. The leaves are about three inches long by two wide, obovate and pinnatifidly lobed, with stem and midrib covered with short prickles. The flowers are bright blue, with yellow stamens, and about one and a half inches in diameter and borne on short racemes. The corolla is deeply five-cleft. I have not yet tried it in the garden, but it looks as though it might prove a good garden annual. We received the seeds from the Munich Botanic Gardens.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Correspondence.

The Elm-leaf Beetle.

To the Editor of GARDEN AND FOREST:

Sir,—I have some old and beautiful Elms about my house, and the Elm beetle is already beginning its work on their leaves. Please let me know the most successful way of fighting these insects, and I should be also pleased to have some suggestions as to the best way to protect trees on the public streets.

Springfield, Mass.

W. F. C.

[All the most successful methods of combating the Elm-leaf beetle have been published in this paper from time to time, but the safest way to attack the beetle itself is by spraying with some compound of arsenic. A good formula for a spraying mixture is one pound of London purple, six pounds of lime and four quarts of flour in a hundred gallons of water. The lime prevents injury to the foliage by free arsenic, the flour makes the drench somewhat pasty and adherent. Of course, the mixture must be kept stirred, and it must be applied in sufficient quantities and with enough force to touch the surface of all the leaves. On a private place any of the numerous hand-pumps will be found effective, and to reach the top of tall trees an extension pole, such as is used by Dr. E. B. Southwick in the parks of this city, will help to spray any tree that is not more than fifty feet high. The first section of this pole is sixteen feet long and three-quarters of an inch in diameter; the second one is a quarter of an inch in diameter and eighteen feet long; the third is a bamboo bound to the top of the second one, and it is also eighteen feet long. The second pole has two rings or bands at its base, so that it can run up or down, and is hoisted or lowered by a small rope and pulley. The hose is a quarter-inch orifice and made of rubber-cloth insertion, which is strong and light. For larger trees one man can climb up in the branches, and then by using the pole the entire head of the tree can easily be sprayed. Of course, there are various nozzles like the McGowan, the Cyclone, and almost any of them are effective. The spraying should begin as soon as the beetles commence to work, which is when the leaves are rather more than half-grown. It should be repeated every three weeks all summer long, and if the poison is washed off by drenching rain the spraying should be made oftener.

As soon as the larvæ begin to climb down the tree the large limbs and the trunks should be sprayed with the kerosene emulsion. This is made by boiling together six

pounds of soft soap, four quarts of kerosene, two quarts of crude carbolic acid and two gallons of water. This is then diluted in one hundred gallons of water, and it should be sprayed on the trunks and wherever the larvæ are seen, and the ground about the base of the trees, where the insects are found in the form of pupæ, should also be sprayed. This last work should be very thoroughly done, because the insects can be easily attacked and killed in this way, and their destruction at that season will prevent the ravages of the beetles next year.

Of course, in large towns, or wherever there are large estates, several owners can unite together and purchase a steam spraying outfit, by means of which much more rapid work can be done. Several men can be employed at once to manage different lines of hose, and while two or more men are directing the spray into as many trees the same number are climbing adjacent trees, so that the engine and its attendants are occupied all the time. If the nozzle is moved rapidly about, a large tree can be sprayed in three minutes. Some arrangement for climbing large trees without using telegraph-clamps, or creepers, as they are called, ought to be devised, because these sharp metal points penetrate the bark and leave the tree a prey to other insects and fungi. Spraying is not an expensive matter where there is any coöperation, and the machine can be used against other insects, like the tussock moth, which attacks trees of other species. In several places in the country enterprising men have gone into the business of spraying fruit and shade trees—that is, they have one or more complete outfits of machinery, which they send with skilled men to operate them, taking the contract for a certain number of applications during the season at the proper time. No one now attempts to grow orchard fruits on a large scale without facilities for spraying against insects and fungi. It is just as necessary to use these remedies in the case of trees planted for shade or ornament as it is for trees planted for fruit.—ED.]

Close of the California Orange Season.

To the Editor of GARDEN AND FOREST:

Sir,—The orange season is practically at an end in California. There are a few scattering car-loads of Mediterranean Sweets, St. Michaels and Valencias still to go forward, but all of the Navels have been sent east. About 5,600 car-loads have been shipped, and the early estimates varied between 8,000 and 10,000 car-loads.

The prices realized have been the best for the past five years. A large proportion of the Navels were sold at from \$2.50 to \$2.94 a box, free on board in southern California. The average price for good Navels has been about \$2.20, which nets the grower the satisfactory sum of \$1.70 a box. Seedlings and other varieties have also sold well, but the crop of these has been smaller than in former years. A result of these conditions has been to create a great demand for Navel nursery stock, both north and south, the demand for these trees exceeding the supply. Two or three years ago there was a general disposition to test the Mediterranean Sweet and other late varieties. But the Navel has been such a favorite in the markets of the east this winter that it now holds undisputed place as the representative California orange.

That Orange groves are still considered a good investment is shown by the proposed plantings this season. There will be a considerable addition to the acreage of southern California, particularly in San Bernardino County, where the crop has been large, not appreciably damaged by frost, and sold at good prices. Investors in the northern part of the state, encouraged by the returns from the early shipments from Palermo and Oroville, will also make some extensive plantings. It is stated that one orchard to be planted near Palermo, if the trees can be obtained, will consist of fourteen hundred acres. Prime trees in the nursery three or four years ago were worth from \$1.50 to \$2.00 each. Then there was a collapse in prices, owing to overproduction, and an almost total cessation of demand, until trees sold as low as ten cents each. Hundreds of acres of nursery stock were grubbed out and burned. This year there is a demand, not only from California, but from Arizona, Mexico and Florida. Prices have risen to fifty and seventy-five cents a tree, and it is predicted that the Navels will be worth at least a dollar apiece next year. Many nurserymen

who have a stock of late varieties are budding them over to Navel buds, although it is a disputed question whether the resulting trees are strong and healthy. As it requires four years to mature a tree for transplanting from the seed there will probably be good prices for all the trees now in the nurseries.

Reports from different parts of southern California indicate that the Orange-trees are setting heavily, that the climatic conditions have been favorable so far, and that, barring hot winds in the summer and frosts next winter, the coming crop will be a large one.

About forty per cent. of this year's crop has been handled by the Southern California Fruit Exchange, and those who have adopted this method of sale are said to be very well satisfied with the returns; the Exchange has received the highest prices in its history.

Some criticism has been made about the statement which appeared in the issue of GARDEN AND FOREST for February 5th, as to the degree of cold in Riverside on December 29th and 30th, last winter. It has been argued that it was unfair to place the lowest record of the thermometer at Riverside at seventeen degrees, and in other near-by places but twenty-six degrees. Nevertheless, the mercury did fall to seventeen degrees at one point near Riverside, although this degree of cold was not reached anywhere else. But the injury resulted not so much from an extremely low temperature as from its long continuance below freezing-point. The effect of this was not only seen in ruined fruit, but also in some groves in that locality from which the leaves have fallen and new foliage is appearing. To make the best of the matter, the frost was a very serious calamity and the results show that the original statements were substantially correct. At least 1,500 car-loads of oranges were rendered unsalable by the frost at Riverside, and the 500 car-loads shipped east immediately after the frost was damaged and brought reduced prices, so that little was realized above the cost of picking, packing and forwarding. The total shipments to this time are about 1,900 car-loads, and there are said to be about 100 car-loads now remaining in Riverside. Much of the fruit sent from Riverside since the frost, exclusive of the first 500 car-loads, has been sold at good prices, some of it as high as \$2.75 a box free on board. Just what proportion was first-class fruit and what of a lower quality I do not know. Of course, it is unfair to make comparisons, and to state that any section was more seriously damaged than the facts warrant. The loss by frost this year was a loss not to any single locality, but to all of southern California, since it emphasized the disagreeable fact that the Orange groves of this section are liable to a certain degree of damage by frost.

In spite of this fact, Orange groves are held to day at very good prices. The best are not for sale at any reasonable price. Good young orchards from five to six years of age may be bought at from \$500 to \$600 an acre. Others are held higher. One that I know of, of twenty acres, the crop of which brought this year \$2,300, at six years of age, is held at \$18,000. It is expected to produce a very much larger crop next year. From \$800 to \$1,000 an acre is the ruling price for such bearing groves, in the best localities, as are for sale. An acquaintance quoted to me a return of \$325 an acre from an orchard of old seedling trees. The largest yield that I have heard of and believe to be authentic is one of \$18,000 from forty acres, an average of \$450 an acre. These oranges were Navels, and were sold at the highest price. The best five acres in the tract brought a return of \$800 an acre. I believe an average profit of \$100 an acre a year to be reasonable and not an overestimate.

Redlands, Calif.

Wm. M. Tisdale.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—We have been fortunate in escaping drought through local rains. Our pasture-fields were seldom greener, but farmers only six or eight miles away complain that the ground is dry as powder, so that the Corn has not begun to germinate. The Yellow Locust, which is more abundantly planted in this neighborhood than any other tree, is past flowering, and the Clammy Locust, Robinia viscosa, and its varieties are in full bloom.

A group of young Laburnums and White Fringe trees is now the most beautiful object in our shrubberies. These trees are most effective when planted together. Both have handsome foliage and drooping flowers which open at the same time. Some bushes of Scotch Broom, planted near them, combine to make a sunny picture of their little shrubbery. The Chionanthus Virginica, or White Fringe, is, perhaps, the most

beautiful small tree we have. When in flower it is adorned as for a bridal morn, with a delicate white veil of bloom which resembles nothing so much as filmy lace. In the damp, cool weather we are now having this exquisite bloom has lasted for ten days, fresh and dainty as at first. The *Chionanthus* delights in rich soil and should not be crowded in with other shrubs. Given plenty of room it develops into a symmetrical, well-rounded little tree. The *Laburnums* are here planted ten feet apart, where they receive partial shade from large *Tulip-trees*, in company with, but not crowded by, the *Fringe-trees*. The flowers of *Phlox divaricata*, now passing out of bloom, vary from a striking shade of deep purplish blue through lead-color to white. We bring it from the woods and plant it in the wild garden, among the rocks, under the shade of Oaks, in company with *Delphinium tricornis*, *Columbine*, *Wild Geranium*, early *Crowfoot*, *Stellaries*, *Rue Anemones* and *Maiden-hair Fern*. The latter we have to water constantly through the summer, and with all our care have little success with *Ferns* on our dry uplands. They do not grow naturally in our woods, but we find small ones in abundance on the cliffs of the *Potomac*, where they cling to the face of perpendicular rocks and peep from their crevices in company with *Columbines* and other delicate wild flowers.

Yellow Lilies—*Hemerocallis flava*—and German Irises of pure white, lemon-yellow and delicate gray-blue, form a fine group on the lawn against a green background of shrubs. Near-by, and in striking contrast, is a bold mass of double *Paeonies* in deep crimsons, carmines and flesh colors. These are really gorgeous in coloring and require hardly any care. We never disturb them; they grow so densely that no weeding is necessary, and a heavy mulching of manure in the fall, lightly worked into the soil in the spring, is all the attention they need to make them increase in size every year.

We found the first rose on the tenth of May. It was the very early *Cinnamon Rose*; *Rosa rugosa* and the *Persian* and *Austrian Briers* followed quickly after; and then came *R. multiflora* and such old favorites as the *Hundred-leaved Rose*, the *Hermosa*, *Giant of Battles* and the *Roses of Provence*. The *Crimson Rambler* is now in bud, and *Madame Georges Bruant* is just opening a few dew-filled cups. *Monsieur E. Y. Teas*, *Ulrich Brunner* and *Pierre Guillot* are the handsomest deep-red *Roses* here, and all of them show a few fresh flowers.

Shepherdstown, W. Va.

Danske Dandridge.

A Natural Garden.

To the Editor of GARDEN AND FOREST:

Sir,—It is easy to find in the neighboring sand region natural gardens which, in variety of plants and in beauty and distribution of colors, equal those arranged by art. One of these was observed early in May. The area comprised about one hundred and twenty by fifteen to twenty feet in width. The fresh, but thin, grass formed an even turf and furnished a lively green foil for the various plants scattered over its surface. It sloped away from a sandy knoll at one end to wet ground and pools of water at the other. Sitting on the knoll one could readily distinguish most of the plants which made up the picture and study their colors and arrangement.

The brightest and most abundant flower was the *Painted Cup*, represented by both yellow and scarlet varieties and many shades between. The *Wood Betony* carried spikes of flowers of a pale yellow hue, set among the prettily divided pinnatifid leaves clustered at the base. *Bluets* peeped out from the midst of blades of grass, and in the wet ground and shallow water were *Marsh Marigolds*. The *Strawberry* and large-flowered forms of the *Windflower* added a dash of white. On the knoll were bunches of *Viola pedata* with large pale blue flowers, and in the damper ground *V. sagittata* showed a deep shade of rich violet-purple. There were dainty little cups of the *Dwarf Blueberry*, white, tinged with rose, though its chief contribution to the scheme of color came from the deep red-brown of the newly expanding buds and leaves. The most stately plant was the *Swamp Saxifrage*, raising a panicle of greenish flowers on a stout hairy scape, from the midst of large lustrous leaves. Here and there in dryish spots were the flat-topped clusters of whitish flowers of *Comandra umbellata*. The *Wild Lupine* was approaching flowering, and held above its symmetrical leaves clusters of blue and white buds. *Maianthemum Canadense* was plentiful, also in bud, and mainly noticeable for its broad smooth leaves of lively green. The grass-like *Luzula campestris* was in fruit, and the *Cotton-Grass* was beginning to show the long white down bursting from the rusty scales of the maturing fruit. *Ferns* were springing up, and the *Flowering Fern* vied with the *Dwarf Blueberry* in the color of its fresh foliage. The stout

hairy fronds of the *Cinnamon Fern* were beginning to uncoil, and stood in yellowish or rusty brown bunches. Stems of *Equisetum* rose beside the *Marsh Marigolds* or crowded the pools with slender columns. In the grass the beautifully compounded leaves of a *Thalictrum* were making their appearance. Small shrubs of *Salix humilis* and *S. longifolia* were scattered about, displaying cinereous and silky leaves. A diminutive *Gray Pine*, barely more than a foot high, stood in the grass, its short stiff needles giving to the wild garden a touch of the adjoining woods and *Pine-clad* sand hills, and though below the *Willows* in stature, it was still a tree in form and dignity.

Chicago, Ill.

E. J. Hill.

Recent Publications.

Circular No. 12, issued by the Division of Forestry of the United States Department of Agriculture, is devoted to the physical and mechanical properties of the southern Pines. The data contained in this circular are condensed from 20,000 tests and an equal number of measurements and weighings, and it is published now to make the information speedily available, while fuller details will be given in a special bulletin. The importance of trustworthy information regarding the Pines of the south is evident from the fact that they furnish most of the hard pine material used for constructing purposes in the country, while the annual cut is certain to increase rapidly as the soft pine supplies of the north decrease. The Pines under consideration are first the *Long-leaved Pine* (*Pinus palustris*), the *Cuban Pine* (*P. heterophylla*), the *Short-leaved Pine* (*P. echinata*) and the *Loblolly Pine* (*P. Tæda*). The names of these timbers in the market are often used interchangeably, and the materials are mixed in the yard, and trustworthy microscopic distinctions of the wood of the four species have not yet been found. There is a very interesting paragraph in which the diagnostic features of the different woods are given to assist the identification of the species. This is followed by a table giving the bending strength and compression strength of the wood of each species, together with the relation of the strength to the weight. An interesting study of the distribution of the weight and strength throughout the tree furnishes a basis for a diagram which distinctly sets forth these variations in the different species in a graphic way. There are brief chapters on the influence of locality and of moisture, on the behavior of different woods in shrinking, the effects of kiln-drying and the influence of immersion in water on the strength of the different woods. The tests have proved conclusively that timber which has been boxed or bled for turpentine is quite as strong as that which has not been so treated if it is of the same weight, that the weight and shrinkage of the wood is not affected by bleeding and that the bled trees contain practically the same amount of resin as unbled trees; the loss of resin referring only to the sap-wood. The results of tests of strength with large beams and columns are most interesting. When we consider the care with which these experiments have been made, the large number of trees and test pieces which have been used and the uniformity of the methods employed, it will be seen that this work is of serious value, and, perhaps, it is the best original work that has yet been accomplished by the Forestry Division. It ought to be added that this circular is written with a conciseness and a clearness which deserves the highest commendation.

Notes.

No. 7 of the third volume of the *Contributions to the United States National Herbarium* is devoted to a continuation of Professor Coulter's study of *Cactaceæ*, containing a preliminary revision of the North American species of *Echinocactus*, *Cereus* and *Opuntia*.

Professor N. L. Britton, of Columbia College, has been appointed Director of the new botanical garden to be established in Bronx Park, in this city. Professor Britton has been Secretary of the Board of Managers ever since the project took form,

and it is due to his untiring labors more than to any other cause that the scheme has been organized under such promising auspices.

There were abundant rainfalls in central and northern California last week, and these were followed by frosts which did serious injury to the young shoots of the vines in Napa and Sonoma valleys. So far this year has been an exceptionally trying one for the orchards and vineyards of California.

The auction sales of plants in this city have been unusually large this spring, and common garden plants of good quality have brought so far remunerative prices. The demand is so great that special sales have been held almost every week, when the prices realized were as good on the average as those on the regular days.

Last week brief mention was made of the intrepid explorer and botanist, Father Delavay, so widely known for his botanical researches in China. It is worth adding here, as indicating the scope and magnitude of his labors, that, according to the *Bulletin of the Botanical Society of France*, Father Delavay discovered in the difficult mountain regions of Yun-nan more than fifty new species of *Rhododendron*, as many species of *Pedicularis*, forty new *Gentians* and as many *Primulas*. He sent to the Herbarium of the Jardin des Plantes about four thousand species, of which one-half were new.

A bulletin just issued by the New York Experiment Station treats of the Carnation rust, which is considered, after all, one of the most serious enemies of that plant, although it is not so much dreaded as it once was. The pamphlet contains what is known at present of this disease, and will prove interesting to all students of fungi as well as all those who grow these plants to any extent. The following treatment is recommended: Grow varieties the least subject to rust. The variety William Scott, for example, is nearly rust-proof. Cuttings should never be made from diseased stock, and it should be borne in mind that plants may be diseased and not show it. If there is any danger of the presence of the disease the cuttings should be dipped in a solution of potassium sulphide of the strength of one ounce to a gallon of water, so as to kill any spores which may cling to them. Fresh sand should be used in the propagating-bench. From the time they are struck until the plants are exhausted by flowering they should be sprayed every week with potassium sulphide or copper sulphate. Before the plants are brought in in autumn the houses should be fumigated thoroughly with sulphur. There is no known method of wholly preventing infection in the field, but plants grown all summer under glass can be more easily managed.

An unusually successful meeting of the New Jersey Forestry Association was held in Plainfield on Thursday last. In the afternoon, after a business meeting, there was a lecture by Professor B. D. Halsted on Diseases of Trees, which called forth an animated discussion as to the practical methods of keeping trees in health. In the evening Mr. Fernow, Chief of the Division of Forestry, delivered a lecture from which we hope to make extracts in some future number. There was a very instructive exhibition of photographs, maps and other illustrative matter, and the arrangements for exciting the interest of school children were made a feature of the meeting. On Friday the officers of the Forestry Association and a number of the members, together with the Palisades Commissioners, were taken up the river in one of the boats of the Pennsylvania Railroad Company to see how the cliffs had been mutilated by quarrying. Messrs. J. J. R. Croes and W. D. Morse, of the Palisades Commission, explained the proposed measures for protecting this territory as a national park and forest reserve. John Gifford, the State Forester of New Jersey, who has lately traversed this district on foot, explained the character of its forests and the advantages to be derived from having a school of forestry so near to a city like New York.

California cherries, large and showy, are now coming in large lots, the first car-loads being due here this week. Among varieties now here are Rockport Bigarreau, handsome and large, pale amber, marked with red, of good quality, and highly esteemed for canning and for shipping. Governor Wood is another good light-colored cherry now in season, and the first Royal Annes arrived last Monday; these were small, however, and fair specimens will hardly be seen within ten days or a fortnight. Black Tartarians are, perhaps, more plentiful than any other variety. A fair price at retail is forty cents a pound. The first apricots of this season arrived on Saturday, and while

some are of fair size and coloring, even the best are immature, and find slow buyers in the wholesale markets. Strawberries have been in scant supply and of inferior quality for the lack of rain, but are now beginning to come in better form. The best from Maryland commanded on Monday twenty-five cents a quart. Florida peaches cost \$1.00 a dozen. Gooseberries may be had for twenty cents a quart, and huckleberries for the same price. Almeria grapes are still shown in the best retail fruit-stores and bring seventy-five cents a dozen. White Muscats and Black Hamburgs, from Newport graperies, sell for \$2.50 to \$3.00 a pound. Rodi oranges, from the Mediterranean, and California Navels both command high prices, and since the stock is not heavy, and strawberries have been in rather scant supply, there is sufficient demand to sell this fruit at \$4.50 to \$5.00 a box, wholesale. The Navel oranges now on the market are mostly from cold storage, but some seedling oranges are still coming from the Pacific coast. Lemons have been cheap, and nearly 220,000 boxes are now on the way to American ports. Pineapples are coming from Cuba and the Bahamas; 16,286 barrels were received from Havana during last week, and two schooner-loads are due this week from the latter islands.

Messrs. James Lindsay & Son, fruit salesmen, of Edinburgh, Scotland, have written us some interesting notes about American apples, some of which we present to our readers to supplement the statement of Messrs. J. C. Houghton & Co., of Liverpool, England, which was given last week. In the Edinburgh market, as in other markets of Great Britain, the best grades of well-colored apples are in the highest demand, such as Baldwins, Northern Spies, the genuine Spitzenbergs, York Imperials and Romanites, from Virginia, which last are quite different from the fruit of the same name from other parts of the United States, the latter being a pale, undecided color, instead of dark rich-looking like the Virginia fruit. Baldwins are inclined to ripen quickly, but their quality is liked and they always command a ready sale, bringing from \$4.50 to \$5.50 a barrel. The Northern Spies are favorites, especially those from Canada, which seem to be superior in keeping quality to those grown farther south. Many apples are exported as Spitzenbergs which do not have the shape of the genuine fruit and which are quite inferior in flavor and have none of that dissolving quality which distinguishes the true fruit. The King apples, especially those from Canada, take the first rank on account of their color, their flavor, their fine fibre and the rich look of their flesh, and they always bring good prices. Of course, the Newtown Pippin is the favorite among green apples, and those grown in Virginia of the finest flavor and most melting quality, in ordinary seasons range from \$5.00 to \$7.50 a barrel, but owing to their abundance this year prices ruled lower. It should be noted that there are two kinds of Newtown Pippin which reach Great Britain, one of which is gritty, hard and inclined to be dry, resembling somewhat the Swaar. They are more beautiful, however, than the Virginia Newtowns, which do not look as bright, being of a greenish yellow with a small red spot. The Rhode Island Greening is always in demand for cooking purposes, and Greenings grown in Canada have superior keeping qualities. The prices rule from \$3.50 to \$3.75 with a fair ordinary supply, but when the importations are excessive they have fallen as low as \$2.75 a barrel. There is little demand for Russets, except when other apples are scarce. During the season of abundance they are neglected and sell at low figures. The York Imperial is a comparatively new apple, but as it has arrived this season it commands good prices on account of its size and bold appearance. It has brought from \$4.00 to \$4.50 generally, but when other kinds are scarce it has sold for as much as \$5.50. Rome Beauties have not been known much until recently, but being of good keeping quality and bright color they command ready sales, although they are rather dry in quality. Ben Davis has little to commend it except fair keeping qualities, and there is no active demand for it when there is anything like a fair supply of other kinds. Winesaps from Virginia are much sought for here. They have a rich deep color and superior flavor, excellent keeping quality, and they carry well, so that they have everything to recommend them. They generally sell at from \$4.50 to \$6.00 per barrel. The so-called Winesaps from other parts of the United States are often poor and soft. This may be due to lack of care in thinning and sorting, but, as it appears in the English markets, the even-sized, beautiful fruit from Virginia is quite as distinct as if it was a different variety, as perhaps it is. In richness of flesh the true Winesap can hardly be surpassed. The Fameuse is also a great favorite on account of its flavor and the absence of any grit in the flesh, while the smooth texture of its skin is near perfection.

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County Parks.

MANY of the justifying reasons for the establishment of parks in cities will not apply to the conditions of country life. There is no need in the country of spacious open areas as antitheses to closely built stone blocks; there is no need to provide spaces for the admission of air and sunshine; there is no need of providing grass and trees as a refreshment to eyes and minds wearied by the constant prospect of rigid and rectangular enclosures. Nevertheless, grounds for associated recreation are quite as desirable in the country as in the city, and since the commons of our earlier history have gradually passed under private control there is an increasing need of provision for associated recreation which can only be met by devoting certain lands to public use forever. Of course, this is not a novel idea, but it is one which is rarely presented, and we are, therefore, glad to see that in a late bulletin from the Natural History Laboratories of the State University of Iowa the subject is discussed by Professor T. H. Macbride, who sets forth certain reasons why County Parks, as he calls them, should be established, especially in the western states. By a county park he does not mean simply public land like that owned by Government, which can be claimed and plundered by the first comer, nor, indeed, land which can be made use of by the public indiscriminately and without restriction, but land devoted specifically to public enjoyment as a holiday-ground for all the people, rich and poor. In most of our older towns and villages there are to be found greens or squares; annexed to a few of them there are public groves for picnics and other open-air festivities; but what is particularly meant here is a space belonging to a larger community, like a county or several adjacent townships, which would be sufficiently attractive to invite farmers and others who live within a radius of some miles, and large enough to accommodate several parties at once with their vehicles. Of course, such a place should be well watered and there should be woods for shade, and if it contains some romantic glen or waterfall, or other picturesque feature, it would be so much the better. Professor Macbride argues that such parks are needed at once—in Iowa, at least—and that they would have a genuine educational value both on the scientific and

ethical side, and would minister directly to the health and happiness of the community.

In the first place it is urged that the usual experiences of country life are even more weary and monotonous than the conditions of city life. In the farm, and shop, and mine, day after day, season after season, year after year, there the same ceaseless round of toil is repeated, and into it no idea of recreation or refreshment ever enters. A sad picture is painted of the effort of the rural population of the west to outwear its labor-saving machinery, but every observer will testify that this remorseless grind is quite as serious an evil in the east, and that unless something is done to brighten life in the rural districts and preserve the mental and physical health of the people, the generations which follow this will see its effects in dwarfed minds and infirm bodies. The farmer and his family come in constant contact with nature, it is true, but their days are passed in painful efforts to wrest a living from the land, to struggle against untoward conditions of climate and to fight for existence with other forms of life continually. If country people could be lured into a pleasure-ground to spend a day now and then in social mood among the grass and trees and free from care, the practice would, no doubt, have an inestimable recuperative value.

It is not apparent how such county parks could be made useful to furnish lessons in forestry, as Professor Macbride suggests, but every one will agree with him that a well-kept county park would be a perpetual object-lesson in the best means of preserving and enhancing the essential landscape beauty of any given area, and that this would suggest ways of making home-grounds attractive. That little thought is given to this matter in any part of the country is a matter of common notoriety. This is so unusually true that a farmhouse well adapted to its use, built to harmonize with its surroundings, and with grounds planned and cared for so as to develop all that is naturally attractive in the home-scene is so rare as to excite comment at once.

The third reason for the establishment of county parks—in the west, at least—is most interesting. In the older eastern states it is a matter of lamentation that nothing except the bolder original features of the country remain to show what its primitive form and beauties were. The native animals are often extinct, many of the plants are on the way to extermination, the primeval woods are gone. In the more newly settled portions of the country there are places which are still occupied by the original flora, and these can now be rescued before they are laid waste. This is a matter of importance, both from the standpoint of science and of intellectual progress, for it is well said that “such is the aggressive energy of our people, such their ambition to use profitably every foot of virgin soil, that unless somewhere public reserves be constituted our so-called civilization will soon have obliterated forever our natural wealth and leave us to the investigation of introduced species only or chiefly.” No doubt, the organization of county parks would preserve many of these localities as they were, and the very names that are given to some places in Iowa for possible reservations kindle the imagination and suggest scenes of picturesque beauty of cliffs and glens, cool springs and foaming brooks, groves of Pine and wooded hills. There is little doubt that even in the so-called prairie states there are picturesque places in almost every county which would make ideal spots for public recreation-grounds.

How such parks could be cared for is the serious question. New York, following the example of Massachusetts, has a general law in which places of great natural beauty, as well as of historic interest, can be set apart for public use forever. It would not be difficult to frame laws which would enable a county or a township to hold land for public use. The life of the early settlers of the country was a long fight against inhospitable conditions, so that Americans seem to have inherited a tendency to destroy everything that is natural. But we apprehend that the employment

of a few caretakers clothed with police authority would be all the protection needed until the people began to appreciate the value of a public playground, and the strong public sentiment for protecting it would soon be established. In older countries the people have the freedom of many of the most splendid parks and woods in the world. The greens or squares in our little villages are not defaced, for everybody cares for them and public buildings suffer little wanton defacement. The same would probably be true of larger grounds, so that the necessary requirements and restrictions in their use would be obediently and gratefully complied with as soon as the people realized that these grounds were their own, and that they were dedicated forever to the enjoyment of themselves and their children.

THE remarkable increase of bicycle riding in the past year adds a new menace to suburban gardens and orchards. Bicycle riders returning to town from the country with big bunches of flowers tied to their handlebars are familiar objects in the suburbs of all our large cities. It is safe to assume that a large part of these flowers have been gathered without the consent of their owners. Pilfering of this sort is often the result of ignorance or thoughtlessness, and the press of the country can do a real service in teaching a stricter morality than now prevails in the United States upon this point. Flower-stealing, however, is not always the result of ignorance, and it is not an uncommon sight to see women driven by liveried servants with carriage-loads of stolen flowers. Such women have not the excuse of poverty to plead in explanation of their thefts, and no amount of teaching, unless it comes through the judges of police courts, will enlighten their minds on this point. People who grow flowers are always willing to share them with their less fortunate neighbors, as the success of the flower missions throughout the country abundantly proves, but no one, however public-spirited or generous, likes to be taken advantage of or to see his trees and shrubs broken to pieces, or to feel that any rare or interesting plant, whose development he is watching, may be pulled up by some vandal who is very likely to throw it away again before he has carried it a hundred yards, thus adding insult to injury. This ignorance and lawlessness, where plants and flowers are concerned, are serious drawbacks to the cultivation of gardens near our cities, and they cast well-deserved reproach on people who would not take five cents' worth of anything else which did not belong to them. This evil is increasing every year, and it is liable to increase until public sentiment against it is thoroughly aroused, and laws against depredations of this character are promptly and rigorously enforced.

Hemlock for the Tanneries.

IN north-western Pennsylvania the bark-peeling of the Hemlock-trees begins early in May and continues through the summer until the middle of August, and during that time thousands of trees are destroyed and miles of rich woodland denuded. There is no more destructive process to the wooded sections of the country than that of bark-peeling, and unless something is done soon the fine forests of Hemlock in Jefferson, Clearfield, Elk, McKean, Warren, Forest, Cameron and Potter counties will be destroyed from the face of the earth. In recent years the discovery and cultivation of Canaigre in the south-west have promised some abatement of the injury to the forests, but it will be a long time before the Hemlock will cease to be the most profitable source of tannic acid.

Several large tanneries have been erected in the northern tiers of counties, and since 1872 the industry has been a large and thriving one here. Several of them consume the hemlock bark that grows on a thousand acres of woodland every year. When the first tanneries were erected the trees were stripped of their bark while standing and left to die and decay in this condition. There may be seen

miles and miles of these skeleton trees to-day, but such a wasteful process is no longer pursued. When the Pine timber of Pennsylvania became exhausted, a new value was given to the Hemlock-trees, since the owner of the sawmill will not only sell the lumber but supply the tanneries with bark. In some cases the tanneries erect their own sawmills.

An early spring starts the sap in May and loosens the bark so that it can be peeled off easily. Then the men go into the woods by the hundred. The bark-peeling is done altogether by contract. One contractor engages his men, and makes an agreement with the tanneries to supply so many cords of bark. The contractor has to cut roads through the woods that will admit of sleighs in winter and carts in summer, and the products of his men's labor must be piled close to these roads. His contract is a cast-iron one, and he has to live up to it to the very letter. A cord, according to the tanneries, contains 2,200 pounds, and when measured in volume it must be eight feet long, four feet high and four feet wide. Sometimes the contractor agrees to cut and cure the bark by weight, and then much bark can be used that is not the regulation length of four feet.

It takes about two thousand feet of logs to peel a cord of bark, and on the average in the Hemlock forests of northern Pennsylvania it takes one acre to produce ten cords of bark and 20,000 feet of logs. The contractor makes roads through the forests about sixty feet apart, and the logs and bark are piled between them. When the forest runs up on the sides of the hills and mountains the felled trees have to be trimmed and carted down to the roads in the valley, making the work doubly difficult. The peelers go into the woods in gangs of four and cut down the trees, trim off the limbs, peel the bark off, and cut them into the proper size logs. Each gang is composed of two log-cutters, one spudder and one fitter. The fitter goes first and selects his tree and cuts a ring around it through the bark close to the roots, and then another four feet up; the bark is then split down one side from ring to ring, and the spudder comes along and inserts his spud into the slit; with a few deft strokes he peels off the whole piece of bark as clean as a boy rings a chestnut-whistle when the sap is flowing in the spring of the year.

The choppers then follow, and with their axes and saws they soon bring the tree to the ground. The tree is trimmed when it has fallen. The fitter measures off the bark on the giant tree, and the spudder peels it off the same as before, and then the logs are cut to the length desired.

In this way the gangs of men will go through the Hemlock forests, each set of four peeling off from five to eight cords of bark a day and cutting the trees up into logs. One such gang will peel 250 cords of bark in a season and cut half a million feet of logs. The sawmills are ready to work as soon as the bark-peeling begins, and one good mill will eat up the logs from 250 acres in one year. The hemlock lumber cut in northern Pennsylvania in this way amounts to over 80,000,000 feet in a season. This means that over 40,000 cords of bark are peeled and 4,000 acres of forests stripped in a year.

The fitters, spudders and wood-choppers in the Hemlock forests receive only moderate wages, although the work is probably the hardest connected with lumbering. The ruling prices paid to bark-peelers is \$1.25 per day and board, but good spudders can secure \$2.00. The jobber who takes the contract receives about \$1.35 to \$1.50 per cord for gathering the bark, and from forty to fifty cents a thousand for the cut logs. This jobber then employs his men, and expects to make his wages in getting good work out of them. The tanners own most of the woods, and these prices are merely paid to the men for gathering the bark and cutting the logs. The bark-peelers are a typical class of men, who make their wages in gathering the hemlock-bark in summer and live by gunning and doing odd jobs in winter.

The hemlock industry has indirectly helped farming in this region, for it has created a home market for many of the farmers' small products. In the bark-peeling season there are thousands who come to the woods who buy their butter, eggs, cheese, fresh fruits and vegetables direct from the surrounding farmers. Many farmers who owned Hemlock tracts sold them to the tanneries for good prices, and others merely sold the trees on the land, and had the pleasure of seeing their farms cleaned of the trees. It is true that the stumps remained, but these were burnt or rooted out by degrees. More than this, a few of the farmers, seeing the great inroads made into the forests, cultivated the young Hemlock saplings and even planted others, and in time there may be a new industry for them in forest-planting. In the winter season the hemlock-bark has to be carted to the tanneries, and the local farmers find that they can take their teams into the woods and make good wages in a season of the year when farm-work is at a standstill. Many a farmer has made enough cash in this way to pay off mortgages and buy new machinery for his work.

The tanners have naturally made the most profits out of the woods. This is no more than any one could expect, as they invested the capital and did most of the head-work. The price paid by them for the bark has run all the way from \$3.00 to \$6.00 per cord, but never more than the latter figure, and thousands of cords have been sold by them all the way from \$10.00 to \$15.00 per cord. At present, however, there is less profit in the business, and old prices may never return again.

New York.

G. E. W.

Foreign Correspondence.

Tulips.

MR. J. G. BAKER, F.R.S., lectured at the last meeting of the Royal Horticultural Society on the genus *Tulipa*, the botany of which has been a special study with him for many years. A large collection of the flowers of Tulips, representing both species and garden varieties, was sent to the meeting from Kew, Messrs. Barr & Sons, Messrs. J. Veitch & Sons and others. The time was in every sense propitious, Tulips generally being at their very best, and the display made by them in public and other gardens this year being very much greater than anything, perhaps, ever seen before in the neighborhood of London, at any rate. The every-day, somewhat gaudy Tulips of the Dutch gardens are being gradually supplanted here by more beautiful sorts. English Tulips and their sisters, the Darwin Tulips, are finding general favor. The botanical varieties and many of the species or subspecies are also becoming favorites in horticulture. English nurserymen are now growing them largely, for the Tulip is quite at home under the conditions afforded in most parts of England. The display it makes is of fairly long duration, and the charm of the best flowers is equal to anything we get from hardy spring flowers.

Mr. Baker admits about one hundred distinct botanical species, some of these being, perhaps, only subspecies, in a broad sense. When he monographed them about twenty years ago there were only forty-eight, but since then about fifty additions have been made, chiefly by Russian collectors. This accounts for the unattractive names many of them bear, such as *Kolpokowskiana*, *Kesselringii*, *Kaufmanniana*, *Ostrowskyana*, etc. About fifty species are cultivated in the Royal Gardens, in addition to a large number of the named varieties, and for the past three weeks or so they have been a magnificent feature.

The genus is limited in its distribution to the north temperate regions of the Old World, being concentrated in central China. It is represented in North America by the nearly allied *Calochortus*; these two genera, *Calochortus* and *Tulipa*, together having the same distribution as *Lilium*.

The genus *Tulipa* is divided into two sections, namely, *Eutulipa*, the true Tulips, and *Orithyia*, the latter being characterized by a short style, the true Tulips having the

stigma sessile on the top of the ovary. The *Orithyias* are only of botanical interest, *T. sylvestris*, the little yellow-flowered native, being the only one met with in gardens. The characters relied upon to distinguish the species are in the bulbs as well as in the flowers, so that botanists are sometimes at a loss when asked to determine the species from flowers and leaves alone. Most of the big-flowered handsome garden Tulips belong to the group represented by *T. Gesneriana*, of which an enormous number of forms are known, some wild, some of garden origin. This species has been a favorite garden flower for over two hundred years, all the old Tulips, out of which what is known as the Tulip mania had its origin, being forms of *T. Gesneriana*. Mr. Baker is inclined to look upon such so-called species as *T. Ostrowskyana*, *T. Batalini* and *T. Schrankii* as wild forms of this ancient, polymorphic plant.

What are known as English or Breeder Tulips are selected forms of *T. Gesneriana*, in which the petals are unicolored, save a large eyelike blotch of yellow or white at the base of the cup. The value of the variety in the eyes of a Tulip fancier depends upon the clearness and regularity of this eye and the uniformity of the shade or color of the rest of the flower. It is remarkable that the Darwin Tulips, the beauty of which is now generally admitted, are practically sorts which were discarded by the breeder because of the intensity or heaviness of their color and the blue-black eye at the base of the cup. They are, too, stronger and taller in scape than the English Tulip. Of their beauty it is, in my opinion, impossible to speak too highly. Messrs. Barr & Sons have about ten thousand of them in flower in their Tooting nursery, the collection exhibited by them last week being greatly admired. It is due to Messrs. Krelage & Sons, the Haarlem nurserymen, that they should be credited with the discovery and distribution of this fine section of garden Tulips. Of the many sorts in flower at Kew these Darwin Tulips are the most admired. Messrs. Barr have sorted them into about twenty colors and named them, but at Kew they are all mixed indiscriminately in a large bed on a lawn, where they produce a rich kaleidoscopic effect.

Breeder tulips are peculiar in their habit of changing color, "rectifying," as the fanciers term it, after a time. There does not appear to be any cause, time or season for this change; it may happen when the bulb is six years old or not till it is sixty, practically not at all. The change is a very decided one as regards color, those flowers with yellow eyes becoming feathered all over with that color on a ground color more or less like that of the flower before the change takes place; those with white eyes being feathered with white, the former are called Bizarres, the latter Bybloemens. The value of the rectified flower depends upon the clearness of the yellow or white, upon the regularity of the feathering or flaming, the size and form of the petals and shape of the cup being also of importance. Tulip fanciers pride themselves on having the Breeder and rectified flower side by side, and at exhibitions of Tulips they are generally placed together. When once a Tulip has "rectified" it never returns to the Breeder state; this can only be obtained by means of seeds, and from these may come all sorts except the one desired.

Long cultivation, selection, cross-breeding, etc., may account for this behavior in this species of Tulip. So far as I know it does not occur in any except *Gesneriana* and its near allies. A few years ago Mr. Baker named at Kew a beautiful Tulip with enormous rose-crimson flowers and a large blue-black eye-like base, calling it *T. macrospila*. For a time it kept true, and a large stock of it was worked up entirely from offsets. Then it began to break, first producing a paler-colored form, and afterward feathered or "rectified" flowers, in which the eye was either like the type or pure white. From this it would appear that no reliance can be placed upon the colors of some of the *Gesneriana* tulips. Fortunately, "rectification" does not mean deterioration, but generally a decided improvement in color attractions.

Mr. Baker called special attention to *Tulip Greigii*, a native of Turkestan, introduced in 1873. It has broad green leaves, spotted with dark brown and enormous flowers of a rich scarlet color, richer than in any tulip, while in the elegance of the curves assumed by the petals it is distinguished from all other species. So far, however, cultivators have not been successful with it, and it remains still a rare plant. Mr. Baker thinks it might pay to try it under various conditions in various climates. If only such a Tulip could be produced in quantity, as the Dutch, for instance, produce the common Tulips, it would be the most popular of all. American horticulturists might act upon this hint.

The cultivation of Tulips is easy, but there are several important points to be remembered, and the first of these is that if grown in the same soil for several years in succession the bulbs are apt to fall a prey to a fungus, the soil becoming what is called Tulip-sick. To avoid this it is necessary to either change the soil every three years or so, or to transfer the Tulips to other quarters. The second point of importance is that of harvesting. If the Tulips are planted in beds that are required for other plants in summer they must be lifted carefully about the end of May and "heeled in" clean coal ashes or light soil till the leaves have faded. Then the bulbs should be cleaned and laid in baskets or trays in the sun to ripen before they are finally placed in store to await replanting in October. Choice species and varieties should be lifted and replanted in a little fresh soil even when they occupy permanent positions in the garden. Some of the species, such as *T. Hageri*, *T. linifolia* and *T. Eichleri*, do well and look well when planted among grass in the wild garden.

London.

W. Watson.

Plant Notes.

Leucothoë recurva.

THE value of the northern native plant *Leucothoë racemosa* for the decoration of the parks and gardens of the northern states has often been insisted on in the pages of this journal. It is a hardy, fast-growing shrub which sometimes attains the height of ten feet; its slender branches are covered with ample dark green leaves which late in the autumn, long after those of every other tree and shrub cultivated in gardens have fallen, assume a brilliant and beautiful scarlet color, and its handsome waxy white cup-shaped flowers are produced in long, erect or slightly curved terminal racemes from buds formed the previous autumn and covered during the winter with closely imbricated bracts. The splendor of color of the leaves of this shrub in the late autumn makes it one of the most desirable hardy plants for our northern gardens.

Although of lower stature, *Leucothoë recurva*, a native of the southern Alleghany Mountains and botanically closely allied to *Leucothoë racemosa*, is almost as desirable a garden plant. It is a shrub with slender ashy gray stems three or four feet in height, slender divaricate branches covered with bright orange-red bark, thin ovate-acute leaves and elongated spreading and recurved racemes of handsome waxy white flowers which open late in May when the leaves are about half-grown.

Leucothoë recurva inhabits shady, rather dry hillsides, and is distributed from south-western Virginia to northern Alabama, growing usually at elevations of from two to three thousand feet. Introduced into the Arnold Arboretum in 1885, whence it has been gradually distributed among the botanic gardens of Europe, it is still rare in cultivation. Mr. Faxon's drawing, reproduced in our illustration on page 225 of this issue, which is the first that has been published of this interesting shrub, is from wild specimens gathered in Virginia and North Carolina.

CERCIS CANADENSIS.—The American Red-bud, or Judas-tree, was described two hundred years ago and was grown in English gardens as early as 1730. Like many other in-

habitants of our forests, however, it has been comparatively neglected by planters in this country, although it is one of the most desirable of small trees all the season through, from the time in early spring when its deep red calyxes and rose-pink petals are clustered thickly along the branches with the opening leaves, until the autumn, when these leaves turn to a clear bright yellow. There is no more striking combination in our wood borders than these abundant flowers of the Red-bud mingled with the white ones of the Flowering Dogwood and of *Cratægus mollis*. We have often spoken of this tree, but we make no apology for again calling attention to it as an admirable garden plant, which is perfectly hardy as far north as New England, and is one of the most effective of trees to place against a background of dark conifers. It thrives in bottom-lands naturally and on swamp borders, but will grow in any good soil, and when allowed a chance to spread it becomes a rather low flat-topped tree, although under favorable conditions it reaches a height of fifty feet. It grows rapidly and begins to flower when it is quite small. The European Judas-tree, *Cercis Siliquastrum*, is not hardy in the northern states, nor is *Cercis Chinensis*, a shrub with large rich-colored flowers, which is often seen in gardens south of Philadelphia, where it is usually called *Cercis Japonica*. Like all other native plants, our Red-bud seems to harmonize with the scenery of the country in which it has developed, and it cannot be too often repeated that our native Crabs, Hawthorns and the Flowering Dogwoods and arborescent *Viburnums* cannot be excelled for massing and composing park pictures.

FOTHERGILLA GARDENI.—This is another native shrub belonging to the Witch Hazel family, which has already been described and figured in this journal (see vol. viii., p. 446). It was also introduced into English gardens nearly a century and a half ago, and yet comparatively few people in this country or in Europe have ever seen it. Nevertheless, in early spring it presents a beautiful and striking appearance with its brush-like masses of long, white, conspicuous stamens produced at the end of branches before the leaves appear. It is a comparatively rare shrub of southern range, and yet it is perfectly hardy at the north, and this spring, in spite of a singularly trying winter, it has flowered with unusual abundance. It is a shrub of good habit, attaining a height of some five feet, well clothed with rich-colored foliage, and is an admirable plant all the season through.

Cultural Department.

Notes from Harvard Botanic Garden.

THE herbaceous grounds of the Harvard Botanic Garden are very attractive at this season. A vast number of plants are raised and tested yearly, and while some are of botanical interest only, there are many beautiful plants of distinct horticultural value. A gardener will find few better places to study them.

Among many *Columbines* is seen the true Rocky Mountain species, *Aquilegia cærulea*. From seed gathered in eastern gardens it becomes variable, hybridizing freely with the commoner kinds. Some of the *Cœrulea* × *Chrysanthus* hybrids are handsome, and groups of all shades of red, white, yellow and blue, associated, have a striking effect. The *Globe-flowers*, *Trollius*, make an interesting group. Only *T. Asiaticus* and *T. Europæus* are in bloom now. Old *Honesty*, *Lunaria biennis*, is showy as one sees it here. But it is only a biennial, and soon becomes ragged. *Viola declinata*, var. *losisepala*, is pretty and distinct. Its color is reddish violet, almost a self, excepting only a white eye. Patches of *Cerastiums*, including a giant from Japan, afforded means of comparing the value of these low-growing evergreen *Mouse-ears* for garden effect. A clump of *Helenium Hoopesii*, with large orange-yellow, star-shaped flowers, caught one's eye in the distance, since there are few flowers of its color at this time. *Bleeding Heart*, *Dicentra spectabilis*, established its value as a garden plant when properly placed. Two little pink-flowered *Erigerons*, *E. glabelliformis* and *E. Coulteri*, struck me as likely to be useful plants for naturalizing in grass. They certainly would be pretty if they would do as well as their larger congener, *E. Philadelphici*.

cus. *Verbascum Olympicum* is the grandest of all the Mulleins. Its bold-branched spikes are closely covered with irregular salver-shaped lemon-colored flowers. The prominent violet-colored filaments and anthers, so conspicuous in nearly all the *Verbascums*, are scarcely noticeable in this one. The whole plant is densely covered with a sulphury pubescence. These Mulleins are scarcely distinguishable from the

Emodi is out of bloom, and is developing its large and beautiful pod-like fruit. *P. peltatum* is now open. These are both interesting, if not exactly beautiful, plants with classical-looking leaves. *Funkias* here show their value as shade-plants, succeeding, Mr. Cameron tells me, where it is difficult to get anything else to grow. *Orobis vernus* is past bloom and now in the seed-pod. These Vetches are hard to establish, and



Fig. 33.—*Leucothoe recurva*.—See page 224.

Celsias. *Echium Caucasicum* is a fine dark blue Boragewort. A most graceful spring-blooming plant is *Amsonia Tabernæmontana*. It grows about two feet high. Its terminal thyrsoïd panicles of blue flowers are delicately tinted with a metallic lustre. It succeeds only on moist subsoils, rooting deeply, and is impatient of removal. *Primula Japonica* has proved quite hardy on the rock garden, and is now in bloom. *Podophyllum*

appear to enjoy shade; the only chance of success is with seedlings. *O. palustris* is later in blooming, of a delicate purple color. The vernal Snowflake in bloom was a reminder of days gone by. It succeeds only in sheltered places. In shade also are several patches of *Cypripedium pubescens*. These plants will not succeed on a dry subsoil. *Vancouveria hexandra* is a low-growing and interesting member of the Barberry

family. The only visible sign of the relationship is in the flowers, which are formed almost exactly like those of the Barberry. It is herbaceous, and the foliage in the autumn becomes bronzy and quite ornamental.

Wellesley, Mass.

T. D. Hatfield.

Flower Garden Notes.

ONE must have a firm will these pleasant spring mornings to follow up closely the necessary cultural work, each night brings forth so many distractions of flower and foliage. It is much pleasanter to linger over the newly expanded charms of color and form than to do the necessary prosaic work.

In spite of a dry season the hybrid German Irises have flowered as profusely as usual, with no shortening of stems or decrease in size of flowers, and at about the accustomed season. The fragrance prevailing now is from masses of forms of *Iris pallida*, an Elder-like scent, this *Iris* being the most fragrant of the family, and the best strains being among the handsomest of the bearded Irises, both in form and coloring.

Of other Irises lately in flower, *I. Germanica macrantha* has been glorious with immense blue purple flowers about twice as large as the ordinary variety. The reddish purple flowers of *I. Kochii* are also bold, distinct and handsome. Of the varied Irises in a collection of these flowers perhaps the forms of *I. variegata* will usually prove the most attractive. These are flowers with yellow standards and usually reddish falls, and are mostly bright and attractive, though not of the largest size. Professor Forster's hybrid *Iris Parvar* (*paradoxa* × *variegata*), which has before been described in GARDEN AND FOREST, has again proved to be as reliable as its male parent. It has had no protection or special care in the border, and has shown none of the miffiness of its *Oncocyclus* parents, though resembling it much in foliage and still more in some features of the flowers, which are a beautiful dark vinous red. Another hybrid, *Lupina* × *Ciengialti*, did not show so much influence of the *Oncocyclus* parent and formed surface-creeping rhizomes, which unfortunately succumbed to a wet winter. This was a flower of a very odd hue, a degraded heliotrope. Lately I have had the pleasure of flowering a few more of Professor Forster's seedlings, which it may be interesting to note as a suggestion to growers who may have a fancy for hybridizing uncommon things. It is not possible to give more than a hint of the curious hues thus produced. *I. Parkor* (*paradoxa* × *Korolkowi*), with narrow foliage, flowered with a curious bloom, reddish purple with darker linings and dark signals, orbicular falls and rather modified standards—that is, not excessively large as compared with the falls. *I. Korolkowi* × *vaga* resembled closely one of the forms of *I. Korolkowi*, *venosa*, I think, a flower of small size, fawn color, with dark linings and beautiful styles of a golden brown, and in one stage with a distinct olive reflection. This hybrid produced apparently fertile seed-pods. The reverse cross, *I. vaga* × *Korolkowi*, bore flowers which were dissimilar in form and coloring, the latter being a light red-purple. The standards are tall and pointed. It is several years since *I. vaga* (*Leichtlini*) flowered here, and my memory does not serve for a close comparison. These plants must be soon dried off and kept dormant until late in the year. Another hybrid, *I. Parsamb* (*paradoxa* × *sambucina*), not yet flowered, may be expected to grow without special care, *I. sambucina* being as reliable as it is homely. Irises cross so readily and seed so freely that hybrids are produced with little trouble. There are countless hybrids of the bearded species, but there is still a wide and promising field among the newer species for interesting trials.

Fall-sown annual Poppies are now flowering as the spring seedlings are germinating. One cannot always carry over these fall seedlings from seed scattered in September, but in latitudes no more rigorous than this it is always worth while to make the trial at the risk of loss. Some seasons it is necessary to thin them out, in others few survive, but the survivors are strong plants, far better than can be produced by sowings at other times. Perennial Poppies now in flower are gorgeous, and usually even arrest the attention of those indifferent to any less conspicuous color, but they are not as handsome as the annual Tulip Poppy, *P. glaucum*, whose flowers, scarcely inferior in size, are of a most effective rich and satisfying crimson.

There does not seem to be any special reason why an amateur should take any unnecessary trouble with his garden, and it has always seemed to me that under this head was included the replanting of hardy Water-lilies in the tank boxes each season, most disagreeable and chilly work. My *Nymphæas* in the tanks are in ordinary soap boxes, and have not been replanted for three years. They are running riot now, flowers

are plentiful and as large as the average, and there is more foliage than space on the water, so that it is fair to infer that these plants do not really require the manures rich in humus which are usually advised. This is not strange when one remembers that still waters, not too often changed, accumulate available plant-food from decay of insects and organic matter.

In the centre of my plant border is a Rose bush, now three or four feet high, covered with dainty pink and white single flowers not much over an inch in diameter. This Rose is remountant and bears several crops of flowers during the season. I notice that flower fanciers are quiet before this plant and are usually glad to pocket a few hips, which it bears plentifully. This Rose is the *R. polyantha* remountant introduced a few years ago, of which seeds are offered in the catalogues. It comes readily from seed, from which it flowers in three months, and the plants are perfectly hardy here. In three or four years it has had no winter-killed branches. The flowers vary in coloring and in number of petals.

Elizabeth, N. J.

J. N. Gerard.

Nymphæa gigantea.

THE blue-flowered *Nymphæa gigantea* of Australia is unfortunate in having a specific name which is also applied to a variety of *N. odorata*. I have been unable to see anything very attractive in this variety of *odorata*, especially for Lily ponds where there is a limited water-surface. The common *N. odorata* is preferable, as it flowers profusely in smaller quarters than does its variety. The Australian species is undoubtedly one of the finest of the genus. Unlike any other kind, the flowers can be used either open or closed, for when once they open they close up in the evening in such a way that the outer covering only hides part of the petals. It is, therefore, very desirable for cutting. Unfortunately, this species has the reputation of being difficult to grow, and it is said that young plants go to sleep without any apparent cause; but so will any *Nymphæa* having tuberous roots. If the plants are kept in active growth all the time there is little danger of their going to rest. When starting the tuber into growth, it often makes one or two water leaves and then remains stationary for months. This was my experience at first, and I found that the tubers were planted too shallow in the soil, and when they did sprout, as they almost always do, with stolon-like growths, the roots did not get a chance to take hold of the soil, which as a rule is loose at the surface and very much mixed up with a confervoid growth. Two inches beneath the surface is a safe distance. As soon as the tuber develops two or three fairly good-sized leaves, it is an excellent plan to sever the stolon-like growth from the tuber and pot it carefully in loam and sand and grow it on in this way. If it has no check from a sudden change in the temperature of the water, it will form a blooming plant just as quickly as any of the Zanzibarensis varieties. The little tuber should be put back in the soil to sprout again, which it will do several times over, without any apparent diminution in vigor. In fact, I have sprouted a tuber more than a dozen times during a summer and kept it over till the next season, evidently as sound as ever. By keeping a few plants in a small state all the time we have an unceasing supply, and if one plant fails when put out there are others ready to take its place.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Rex Begonias.

THE popularity of these plants is more or less injured by the fact that quite accurate artificial imitations are so often seen. Of course, these shams can be easily detected by any close observer, but the real plants themselves have, to some eyes, a made-up artificial look, and the prevalence of counterfeits in shop windows helps to strengthen the impression that they are stiff, unnatural and undesirable. Nevertheless, many of them are really beautiful, rich in color and not devoid of grace in form and habit. The varieties of the large-leaved section of these Begonias *B. Rex* is the principal progenitor of, may be counted by the hundred, and new varieties are constantly being produced, all laying claim to some special points of superiority in coloring, form of foliage or habit of growth. Of somewhat recent introduction, and quite a departure in form of foliage, is Countess Louise Erdody, which has the two lobes at the base of the leaf wound in a spiral way suggesting the appearance of a snail's shell. The entire leaf shows a rich metallic lustre, the centre a dark silver shading to coppery rose toward the margin. The plant is a free grower and makes a striking specimen. Leaf-cutting is prob-

ably the most practicable method of increasing the newer and rarer sorts, but well-matured leaves should be selected, and after the stronger nerves on the under side of the leaf have been cut they should be laid in sharp clean sand, a few pebbles being placed on top to keep them down. The sand should be kept moist, but not sodden. Little plants soon begin to make their appearance on the surface of the leaf, but it takes some time before they attain much size. A much more speedy process for the older sorts, from which plenty of leaves can be obtained, is to cut away the principal part of the leaf, leaving only a little of the base, and about an inch of the stalk. If this is inserted in the propagating-bed like an ordinary cutting, roots will soon be emitted from the end of the leaf-stalk, while fresh growths will break away from the old base. By this method good-sized plants can be had in a much shorter time. Divisions of the plants may also be used as a means of increase where only a few are wanted.

Ordinary greenhouse treatment, with moderate shade and plenty of moisture, suits the general requirements of these plants. They like an open, well-enriched compost, with free drainage. During the early winter months they should be induced to rest by being kept moderately dry, and when the days begin to brighten and grow warmer they should be repotted and started afresh. It is not advisable to shake them out severely, but is better to remove only a little of the old soil and use a larger size pot. During the summer months they may be used for house decoration, for grouping with other plants around piazzas and other shady places, and for window boxes or vases, but they should never be exposed to the direct rays of the sun or they are apt to either burn or lose the more delicate tints of their foliage.

Tarrytown, N. Y.

William Scott.

Chrysanthemums.—Plants intended for specimens have had their final shift, and are now well rooted in the new soil. Their growth will be rapid from this time onward, and frequent topplings will be required to keep them well balanced. We shall soon select the most promising plants and spread them into shape with a few of last year's stakes. These will be removed when the final tying out is done. When these bushy plants are left unspread the central stems are weakened and the leaves turn yellow and decay. Light develops them, and the object particularly now is to produce as many growing shoots as possible as a foundation for the future plant. Only the tips of the shoots should be taken, and none must be allowed to get away. When this happens by an oversight, and it is necessary to cut out two or three inches to bring the shoot back to the level of the others, it will be noticed that such shoots rarely break well. I am frequently asked how I manage to keep my plants so even and bushy, and how often I top them. The stopping is done every day without fail. Liquid-manure must not be given until the plants are quite vigorous and becoming pot-bound. A month hence will be time enough. Cuttings intended for single blooms ought to be ready for potting or boxing off, as is most convenient. These, again, will be ready for benching by the 20th of June. First-class blooms can be grown from plantings made at this date, and medium-sized ones from plantings made a month later. This year we are growing a number of Chrysanthemums in eight-inch pots intended to carry from ten to a dozen medium-sized blooms. Large blooms are not available for all kinds of decoration, and medium-sized ones are useful for dinner-table work.

Wellesley, Mass.

T. D. H.

Correspondence.

A New Hybrid Canna.

To the Editor of GARDEN AND FOREST:

Sir,—During a recent visit to Santa Rosa, California, I called upon Luther Burbank, and among other things was shown a new hybrid Canna which, when introduced, will probably create as great a sensation as Madame Crozy did. This plant is not a seedling of the well-known strains so deservedly popular, but is a hybrid between Madame Crozy, which has so long been the standard of excellence, and *Canna flaccida*.

Canna flaccida is a native of Florida, of a dwarf habit, and not a strong grower. Its exquisite light yellow flowers would, in spite of these defects, give it a high place in the garden were they not so very ephemeral. So frail and fleeting are they that an hour in the morning often measures their term of existence. I remember well that it was days before I got a sight of the flowers on a blooming plant of my own. The flower of *C. flaccida* is unique among Cannas in having

something of the grace of an Iris and a peculiar silvery sheen that is very beautiful.

For years Mr. Burbank has been trying to make a cross in which some of these fine qualities of *Canna flaccida* might be united with the vigor and lasting qualities of the Crozy strain, but while many seedlings were grown and bloomed, all, with a pertinacity which is so often the despair of the hybridizer, followed one of the parents, and that Madame Crozy.

Last summer, in the third generation of hybridized seedlings, the new seedling appeared, and any one knowing *Canna flaccida* would have instantly recognized its parentage. Only a single seedling among thousands, yet Mr. Burbank feels that it well repays the trouble.

In the new and as yet nameless *Canna* are united, happily, the Iris-like form, the satiny sheen and the large size of flower of *Canna flaccida*, while the Crozy blood, giving to the plant a vigor of growth even surpassing either parent, and a lasting quality to the flowers about the same as Crozy possesses, is only apparent in the coloring in a lemon more intense than in *flaccida*, and a few reddish spots in the throat.

A marked feature of the new race is the development of some of the minor petals which in the Crozy strain are all but rudimentary. In the new *Canna* they are broad and flat, giving a bold fullness of outline until now quite unknown in Cannas.

Considering the predominance of *Canna flaccida* in this seedling, the most critical point is its keeping qualities. In this regard it is not quite the equal of Crozy. The flower opens up a clear lemon-yellow never before known in Cannas, and is unspotted, except for a few dots well in the throat. With age it becomes lighter in color, and in ordinary weather will last about as long as Madame Crozy, and I think for exhibition it is superior to any other *Canna*.

The foliage is of a light green, the growth a little stronger than that of Madame Crozy, the flowers well carried above the leaves and somewhat larger than those of the Crozy type.

The breadth of petal in the new strain is a marked feature which we can expect future hybridizers to still further develop.

Ukiah, Calif.

Carl Purdy.

[The photograph of a flower of this new hybrid with one of Madame Crozy for comparison shows it to be almost identical with the variety Austria, which we have already described, although there seems to be more scarlet in the lower petal than is found in the flowers of Austria. It seems strange that in such widely separated countries Mr. Burbank in California and Dammann in Italy should have raised plants at about the same time which are so nearly identical, but these coincidences are common. When seen together the two plants may show differences which we cannot observe in the photograph, but their comparative value, of course, can only be determined by actual trial. Dammann's hybrids, Italia and Austria, have raised the standard of perfection in the flowers of these plants, but the question whether they will have substance enough to stand out-of-doors in this climate has not been settled, and it may be that the southern blood derived from *C. flaccida* will be seen in a lack of sturdiness. It is to be hoped that an opportunity will soon be offered to try the California hybrid by the side of the Italian one.—Ed.]

The Stanford University Grounds.

To the Editor of GARDEN AND FOREST:

Sir,—The other day I visited Palo Alto, in Santa Clara County, and spent some time in the beautiful grounds which were the pride of the late Senator Stanford. Much has been written about the University, but I have seldom seen anything in print about the possibilities for future work in forestry and horticultural experiments offered by the great Palo Alto estate. The original San Francisquito Rancho of 1,400 acres was added to by Senator Stanford at various times since 1870, until the property now embraces over 8,000 acres, all of which is dedicated to the uses of the University. The University also owns the famous Vina Ranch of 55,000 acres, in Tehama County, and the Ridley Ranch of 21,000 acres, in Butte County. It is evident that when Stanford University is ready to establish courses in forestry, viticulture, pomology or any and all other departments of agricultural science, whatever lands are needed can easily be set apart, while the operations of the various farm divisions can be made to give much practical training to students. All the estates—in part valley, in part foot-hills—offer a very wide range of soils and climates. In these respects, as

in many others, Stanford University is especially fortunate. The home estate, Palo Alto, lies at the base of the Coast Range foot-hills, near the southern line of Santa Clara County. I have heard this portion of the mountains of the backgrounds called the Sierra Morena; in fact, the whole Coast Range easily divides into a multitude of smaller groups, separated by valleys and cañons.

The site of the University is in a land of Oaks, both deciduous and evergreen. One lordly group of Redwoods, thrust far out from its companions, twenty miles from the coniferous forests, lying toward the sea and ten miles from the nearest hills, has been a landmark from earliest Spanish days. Hence arose the name of the estate, Palo Alto—tall tree. Spanish priests and explorers of the closing years of the eighteenth century, riding hour after hour through the wild Mustard and chapparal of the unfenced valley between Santa Clara Mission and the drifting dunes of Mission Dolores, well knew this great evergreen spire, 200 feet high, at the crossing of the San Francisco. Once it was a group growing from a mass of roots, as is the fashion of Redwoods. We have a record of three trees standing among lesser ones, then of two, but now there is only one, the sentinel of the whole valley, the University tree, par excellence. It was long ago bulwarked with great care against winter floods, and it has passed into college literature. Thus *Sequoia sempervirens* has become the guardian tree of Stanford, even as *Quercus agrifolia* is the preëminent tree of Berkeley.

Senator Stanford was always a lover of trees. He spent much time upon his plantations, and he never allowed a healthy Oak-tree to be removed. About three hundred acres of the richest valley land at Palo Alto were long ago planted with a great variety of shrubs and trees. A large part of these shrubberies and woodlands can be made of immediate scientific value. Nearly every species which the various nurseries of California can furnish is represented here, and doubtless there is much that it would be hard to find elsewhere, for Senator Stanford was a liberal importer of rare plants. The Arizona garden, for instance, could only be duplicated at very great expense, because Senator Stanford's opportunities as a railroad man were unusual. He was able to send men out into the desert and collect the finest and largest specimens of desert plants, bringing them in wagons to the nearest point on the railroad, where they could be loaded on his freight cars.

In driving over the grounds one sees superb specimens of both the Sequoias and of nearly all the other California conifers. Among many fine Araucarias, I noted a noble Araucaria Bidwilli, with trunk fourteen inches in diameter and shaft rising to a height of fifty feet. Very large Hawthorns in full bloom, groups of fruit-laden Oranges and Lemons and many brilliant flowering trees give color to the May-time woodland. Nothing is as yet labeled, and the University botanists and foresters of the future will have a great deal to do in putting this raw material in shape. But it is magnificent material.

The general impression, which is all I have undertaken to give in this brief article, is that of enormous undeveloped resources for future educational work in the right hands at the right time. The estate already has greenhouses and propagating-houses, which can be enlarged when necessary. All in all, the garden, the shrubberies, the woodland, the orchards and vineyards, taken collectively, are equivalent, in some respects, to a twenty years' start. This is chiefly because the Stanford estate was laid out on a grand scale to begin with, and is nowhere cramped.

Niles, Calif.

Charles Howard Shinn.

[Some account of the original design of these grounds by Mr. Olmsted, together with a diagram, will be found in vol. i. of GARDEN AND FOREST, page 507.—Ed.]

Elæagnus multiflora in Wisconsin.

To the Editor of GARDEN AND FOREST:

Sir,—In the spring of 1892, six plants of this shrub, the *Elæagnus longipes* of many gardens, were set on the grounds of the Wisconsin Agricultural Experiment Station at Madison. Two of these plants were set in the lawn, and they have been protected each winter by covering with earth or coarse manure. The other four were set in the nursery and have received no winter protection other than that afforded by snow a portion of the time. The experience gained from these two plantings enables us to judge something as to the climatic conditions that this plant is capable of enduring.

The winter of 1893-4 was considered rather a mild one for this locality. We had one cold period during which the mini-

mum thermometer registered below zero each day for six days in succession, the lowest point reached being eighteen degrees below zero. The unprotected plants in the nursery killed back a little at the tips and produced no flowers the following spring, but none of them were seriously injured. The protected plants on the lawn were alive to the terminal bud and yielded a fine crop of fruit the following summer.

The next winter, 1894-5, was more severe. During nineteen consecutive days, in January and February, the minimum thermometer registered below zero every day but one, when it registered plus two degrees. Three of these days the mercury descended to fourteen degrees below zero, one to sixteen, one to seventeen and one to twenty-one degrees below, the last being the lowest point reached during the winter. The snow in the nursery during this cold period was deep enough to cover about the lower half of the stems of the *Elæagnus* shrubs, and all of the part that reached above the snow was killed, while that below the snow-line not only survived but bloomed freely the following spring. The protected plants showed no injury whatever.

The past winter was unusually mild. The mercury was below zero on eleven different days, but did not register lower than minus thirteen degrees. The plants in the nursery killed back a very little at the tips, but the flower-buds are uninjured.

From these observations we can summarize as follows:

With a minimum of minus thirteen degrees flower-buds were uninjured and stems were very little injured. With a minimum of minus eighteen degrees, wood was not much injured, but flower-buds were killed. With a minimum of minus twenty-one degrees, accompanied by prolonged cold, exposed wood was destroyed, but wood and flower-buds covered with snow were uninjured. No injury has resulted at any time where protection of earth or coarse manure was given.

I find that seeds of *Elæagnus multiflora* buried in sand beneath the soil germinate freely the following spring, especially when washed from the pulp. The seedlings, however, appear quite delicate, and I think, with us, must be taken up in autumn and wintered in the cellar. At least a covering of earth during the past mild winter was not sufficient to save ours from destruction.

It is unfortunate that the fruit of *Elæagnus multiflora* has so much of astringency. There is no reason to doubt, however, that varieties may be obtained that are without this quality, and then we shall have a valuable addition to the list of small fruits which can be depended on in this climate.

University of Wisconsin, Madison, Wis.

E. S. Goff.

A Novel Method of Tree-planting.

To the Editor of GARDEN AND FOREST:

Sir,—The obstacles to fruit-growing on the plains have led to various methods of culture peculiar to the region, and many experiments have been and are still being tried in the hope of more fully overcoming these obstacles. One of the most noteworthy of these is that known in Nebraska as the Leonard method of tree-planting, from the name of the grower advocating it. The greater part of this region is underlaid by a subsoil that, while, perhaps, not so hard as that commonly found in the eastern states, seems to be so hard that the roots of Apple-trees do not penetrate it to any great extent, but spread out near the surface. This, taken in connection with the small rainfall and greater evaporation of the region, seems to be unfavorable to the full development, health and longevity of the tree. The new method of planting is based on the theory that if it is possible to penetrate this subsoil and reach a softer and moister layer beneath, the tree will have access to more water and be able to form a deeper root-system, thereby becoming less subject to the influences of surface and atmospheric conditions. Accordingly large holes, six or eight feet in diameter, are dug deep enough to get through the harder subsoil layers, if possible. If this cannot be done the hole is dug six or eight feet deep, then from the bottom a hole is bored with a post auger, three or four feet deeper, reaching a moister layer of soil, if possible. The whole is then filled with surface-soil, raising it ten or twelve inches above the level of the surface, to allow for settling, and the tree planted in this position. The method has not been in use long enough to determine its value, but it is being watched with a great deal of interest. Trees planted in this way have made a very promising and vigorous growth, but it should be added that Mr. Leonard gives ideal cultivation, and it is impossible to say how much of this growth would be brought about by the cultivation alone. In order to give the matter a comparative test, Apple, Plum and Cherry trees have been planted in this way at the station-farm the present spring, while alternate trees in the

same row have been planted in the ordinary way. Here the methods of culture will be the same for each, and it is to be hoped the merits of the system will be shown. It will be interesting to remove some of these trees as they grow older, in order to see what effect planting in such an immense earthen flower-pot will have upon the habit of root-growth. In this planting the holes were dug about six feet in diameter and six feet deep, with a post auger-hole three feet deep in the bottom of each.

No doubt, most orchardists will say at once that this involves altogether too much work, and it does mean a good deal of work, but it is less expensive than irrigation, which we may sometimes think would bring us almost ideal conditions. These holes can be dug and filled at a cost not exceeding a dollar a tree. Now, reflect that a good Apple-tree in full bearing is worth at least as much as a good dairy cow, and then ask how many dairymen would hesitate to pay one dollar more for a healthy, vigorous, productive cow than they would for one not quite her equal. The important question is not the expense of doing the work, but the effect which such planting will have on the subsequent life of the tree, and no one can answer that question satisfactorily ahead of time.

Agricultural College, Lincoln, Nebraska.

Fred W. Card.

Larch Sack-bearer (*Coleophora Laricella*).

To the Editor of GARDEN AND FOREST:

Sir,—In the spring of 1894 I noticed that the tips of the leaves of the trees in my Larch plantation of five acres had become yellow or brown, as if touched by frost, and later on in many cases the whole leaf dying. This continued through the growing season, many of the trees attempting to put forth a new growth. Not being able myself to discover the cause of this trouble, I sent samples of the twigs and leaves to Professor C. H. Fernald, of the State Agricultural College, who informed me that they were infested with the Larch sack-bearer, as he named it. The caterpillar was so minute and so concealed under cover of the leaf that I had not observed it. On reexamining the trees after this explanation I soon discovered the caterpillars in countless numbers; they bore into the needles, so that the upper ends shrivel up and turn yellow and brown. Professor Fernald wrote me that this insect was first reported in this country by Dr. Hagen in 1886 on European Larches in Northampton, Massachusetts. He also stated that he had observed it on some Larches in Amherst, but had never heard of it elsewhere until my trees were brought to his notice. In 1895 the insects were apparently undiminished in numbers, and this spring they have appeared again; as a consequence, the growth of the trees has been checked.

My trees, although European Larches, were not imported, but came from Douglas, Illinois. The question arises, where did these pests come from? Have they been slowly increasing in numbers from a small and unnoticeable family, or has the horde dropped down from some unknown quarter? On page 311 of vol. iv. of Schlich's *Manual of Forestry* may be found the best description of this moth that I have seen. It is common in Great Britain and Germany. As to remedial measures not much has been attempted on account of the magnitude of the task. On one section, however, the lower branches have been cut off and burnt.

Boston, Mass.

J. D. W. French.

Planting in the Boston Parks.

To the Editor of GARDEN AND FOREST:

Sir,—Two years ago I wrote to your journal about the care of the Boston parks; since that time no improvement has taken place. The most conspicuous illustration of what I mean can be seen in that section of the Back Bay Fens nearest the city. For some reason this section was planted with a general mixture of anything and everything that was at hand, and a more curious collection it would be hard to imagine. Garden shrubs are crowded in with Spruces, showy perennials appear in most unexpected and inappropriate places, and just now weeds and dead wood abound in the most prominent portions.

The use of certain garden shrubs on the edge of a marsh seems to be rather questionable, but admitting their appropriateness, surely if they are to remain some care should be taken of them. At present, crowded in among plants of coarser growth, some dead and others half-covered with deadwood, they present a truly pitiable appearance. In many cases the dangerous practice of planting strong-growing vines among shrubs has been indulged in to a great extent and the evil results are already apparent, so that it really seems as if Boston would be better off if her parks were half as large and twice as well taken care of.

Trained men are needed to take care of our parks after they are planted, a constant thinning and pruning of trees and shrubs must be kept up, and for such work men of skill and experience are needed.

In the meanwhile we keep on in the same way, every year extending our park system (already too large), planting more and more ground and leaving our old plantations to fight it out among themselves.

Wellesley, Mass.

H. S. H.

Why Rhododendrons do not Flower.

To the Editor of GARDEN AND FOREST:

Sir,—I have read your note in GARDEN AND FOREST on the influence of the past winter on the flower-buds of Rhododendrons and other shrubs. I am convinced that Rhododendron buds in this neighborhood were injured in the severe cold snap of the 10th of October, when the thermometer fell suddenly to twenty-three degrees, Fahrenheit, and the most of the mischief was done at that time. The buds on several half-hardy varieties here, which were housed in cellars on the first of November, have been more or less injured, some varieties losing all their buds and others having only a few flowers in a truss. This must have been done before the plants were moved into their winter quarters. I remember that the same thing happened ten or twelve years ago.

Wellesley, Mass.

H. H. Hunnewell.

Recent Publications.

A Traveller's Notes. By James Herbert Veitch, F.L.S., F.R.H.S. Published for private circulation by James Veitch & Sons, Royal Exotic Nursery, Chelsea.

All persons who keep themselves acquainted with current horticultural literature will remember the series of letters from the far east which appeared three or four years ago in *The Gardeners' Chronicle*. Mr. Veitch has brought these together, revised them, added certain connecting links which make the narrative continuous, so that the text and notes, with the illustrations, make altogether a quarto volume of considerably more than two hundred pages. The tour made by the author was through India, Malaysia, Japan, Corea, the Australian colonies and New Zealand, and the work is chiefly descriptive of the vegetation of those regions observed from a horticultural point of view. Mr. Veitch's object was to study the conditions under which the plants of these countries have been developed, with the view of learning something about their cultural requirements when transplanted into British gardens, and also to make a search for such new plants as might seem worthy of introduction into cultivation. On the first page of the text we read of impressive groves of Cocoanut Palms, and all through the book the reader is among plants, garden plants generally, with descriptions of their appearance, habits and uses. Wherever a botanic garden was found its treasures were carefully noted, and one who takes even a cursory glance through these pages will get a fair idea of what trees and plants are most used for decorative purposes in the countries through which Mr. Veitch's long journey extended. There is an interesting map and numerous photogravures and reproductions of photographs by the author, many of which are remarkable, both for the interest of the subject and skill in treatment. Of course, they are largely devoted to plant life, but incidentally we see much of the splendid architecture and scenery of the far east. The pictures are beautifully printed and the mechanical execution of the book throughout is unusually attractive.

Notes.

The *Agricultural Gazette*, of New South Wales, gives the following as an example of the durability of the Yellow Box timber, *Eucalyptus melliodora*: A tree was cut down in March, 1849, and a log fifteen feet long and fifteen inches in diameter was placed while green as the ground plate or sleeper to support the posts of a veranda. About three-fourths of it was under ground, where it has remained ever since, and it is apparently as sound as the day it was cut. Another log of the

same kind of tree, which had been used as a sleeper and has been partly imbedded in the ground for forty-three years, does not show any decay even in the sapwood.

Virgilia trees are flowering in the parks and gardens about New York this year with unusual profusion. The weight of the blossoms is so great as to give the branches a still more drooping habit even than they naturally possess, and as they wave slowly in the wind the long racemes of pure white flowers among the light green and delicate foliage make a picture which cannot be excelled for beauty and grace, especially when seen against some dark background like a mass of conifers.

Since the account of Mr. Burbank's new Canna, which appears in the correspondence columns of this issue, was in type, we have again received from Mr. Frank Pierson specimen flowers of Austria, the new Italian hybrid. The color is a luminous golden-yellow, very pure and lighter in tone than that of the Canna Italia and but faintly shaded at the base of the petals. The splendid flowers stand above the foliage on long stems; they are flat, spreading, bold in appearance and nearly six inches across.

During the five business days of last week 2,420 cases of evaporated apples were received by wholesale merchants in this city, and 2,226 packages of other dried fruits. Since September 1st 159,061 cases of evaporated apples have been handled in this market, and 678,221 packages of other sorts of dried fruits. During last week 7,096 packages of evaporated and dried fruits left this port, and since the season began, nine months ago, 323,780 packages have been exported. Besides apples, evaporated and dried raspberries, blackberries, huckleberries, cherries, plums, prunes, peaches, apricots are now being sold.

Willow Twig, Cooper's Market, Ben Davis and Roxbury Russet were comprised in 1,397 barrels of apples shipped to this city during last week. The highest grade of Willow Twig brings \$5.75 a barrel at wholesale; Ben Davis, \$5.00, and Roxbury Russet, \$3.25. Cherries from near-by points are offered at fifteen cents a pound, retail. Cultivated blackberries of good size and quality, from North Carolina, cost twenty cents, and huckleberries, from the same state, an equal price. Green gooseberries are in limited supply, and sell for fifteen cents a quart. The first watermelons of the season came from Florida early last week, and sold at from sixty to seventy-five cents, wholesale.

One of the most important vegetable productions of Persia is the crop of dates which are grown to great perfection in many parts of the country. The Date Palms begin to yield at about three years of age, reaching their prime at thirty, and a good yield for one tree is from eighty to one hundred pounds. The flowers are fertilized by hand, one male tree supplying pollen for perhaps forty pistillate trees. The dates used for export are those that grow at the summit of the trees. From the action of the sun they become hard and dry and are thus easily packed, while those on the lower branches remain soft and are kept for local consumption. The exports of dates of the country could be easily doubled by planting fresh groves of Palm.

The first sugar corn of the season, from Florida, is now offered in our markets at seventy-five cents a dozen ears. Peas are coming from New Jersey, Maryland and Virginia. All the summer vegetables, but Lima beans, may now be had well grown and ripened, excepting tomatoes, which for the past few weeks have been poorly colored. Potatoes have been plentiful and cheap, the best Bermudas costing \$4.00 a barrel at wholesale, those from Florida \$3.00, and from New Orleans \$2.50. As many as 15,000 barrels of this staple arrived from the south during last week. Owing to dry weather the bulk of the stock is small. The supply of domestic potatoes from last year is still considerable. During five days of last week 40,806 barrels of the latter were received in this city, besides 2,875 barrels from Bermuda and the West Indies. In the same time Bermuda sent 21,205 crates of onions, and 5,967 bags came from Egypt.

One of the remarkable and often observed correlations between the scent of flowers and the animals who visit them is the development of the floral odor just at the time when the insects fly. Professor Kerner cites the example of certain species of Honeysuckle, Petunia, some Orchids and other plants which smell faintly or not at all in the daytime, but give off abundant odor between sunset and midnight, just

when the insects fly which feed on them. Various Pinks and Pelargoniums, which are visited by small night moths, exhale a strong odor of Hyacinth at twilight, but give off no scent during the day. On the other hand, many flowers which are visited by bees and butterflies in the daytime become scentless at sunset, like the ornamental Clover, *Trifolium resupinatum*, which smells of honey in the sunshine and becomes scentless when the bees return to their hives in the night. The same is true of the Grass of Parnassus, and a species of *Daphne*, which grows in the Pyrenees and emits a delicate violet odor during the day, but has no smell whatever after nightfall.

If the fruit-growers of the country suffer from diseased trees and vines, which can be prevented by spraying, it will be their own fault, as the literature which gives full directions for the prevention and cure of these ordinary diseases is increasing every month. A farmers' bulletin, entitled *Spraying for Fruit Diseases*, contains the latest authoritative directions which we have seen. It is written by Professor Galloway, Chief of the Division of Vegetable Physiology and Pathology, and gives the method of preparing the various fungicides, the special qualities of each and the proper time and the best means of applying them. The various diseases of the Grape, Apple, Pear, Quince, Cherry and Plum which yield to treatment are also briefly, but accurately, described, and all this within the compass of a dozen pages. In the final paragraph fruit-growers are urged to bear constantly in mind that the treatments are not curative, but preventive, and that it is, therefore, necessary that the spraying should be made at the proper time and in a thorough manner. Of course, a saving of both time and money will follow where experienced and trustworthy labor and first-class machinery are used, and the plants will be more certainly protected. Poor help, cheap makeshift machinery and lack of personal and intelligent supervision by the fruit grower himself are the chief causes of failure.

We have been interested in a little pamphlet on *Potato Culture on the Island of Jersey*, written by the Rev. Charles B. Merrill, of Beloit, Wisconsin, and published at Medina, Ohio. It is a complete description of the methods of raising Potatoes for the great markets of London and Liverpool in the Channel Islands, and shows how what is called high-pressure gardening can be made to pay on small areas. The details of the practice in the Island of Jersey might, perhaps, not be strictly adapted to our different climates and soils, but as the principles of plant growth are the same the world over there is much in these pages to make American farmers reflective. In a soil which has been cultivated for a thousand years and which has grown richer all the time, where careful tillage makes it easy to work, and clean cultivation has practically exterminated weeds, the Jersey farmer has a great advantage to begin with, but he does not neglect his crops for this reason, but gives them all the more care. He mellowes the soil deeply, fertilizes it freely with manures which have been made as fine as possible by rotting, grinding or liquidizing, spares no expense to secure the best of seed, of which he plants thirty or forty bushels to the acre, and sets the tubers in a particular way in every hill, cultivates thoroughly, harvests with the greatest of care, markets the crop as soon as it is gathered, and then hauls it over the smoothest of roads so that not a single potato is bruised or chafed on the road. The seed is never cut, but the whole tuber is planted, and then all the vigor is thrown into two or three strong shoots, rather than into a dozen weak ones. The result of all this care is abundant and paying crops. Seven thousand and seven acres, or one-third of the crop-land of the whole island, was planted in 1894, and 60,605 tons were exported, with 15,000 tons kept at home for seed and food. The average yield of the whole per acre was 333 bushels, or more than ten tons. The average price received an acre was \$343, or an average net cash of \$260. The highest yields to the acre were 500 to 600 bushels, and the highest receipts to the acre were from \$500 to \$600. This was not an exceptional year, but for twelve years past the yields and prices have ranged about the same. In other words, during these twelve years more than twenty millions of dollars—that is, more than \$300 for each acre of the Potato area every year have been brought into this country. Potato-culture is such a settled and sure source of profit that it seems to have no element of experiment or uncertainty, so that the cash rents of land range from \$25 to \$65 an acre a year, and the lands sell for from \$600 to \$1,500 an acre, if they are offered, which is rarely done, except because of death or misfortune. Though most of the farmers till their own land, yet applications for rent are continuous, and farmers whose fields are in fine condition have been offered and have refused \$70 an acre annual rent.

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Where Competitive Examination may Fail.

ABOUT a month ago the office of landscape-gardener and forester for the city of Philadelphia was to be filled, and the Board whose duty it was to name the man decided to open the place to competitive examination instead of making it a subject of personal patronage. Precisely what the duties of a city landscape-gardener and forester may be in Philadelphia we do not know. He probably has charge of the street-trees and superintends the construction and planting of the small parks, and if these are his functions the examination would give a fair idea of the knowledge of the applicant in this particular field. There were questions in surveying, in drawing as applied to landscape-gardening, and in road-building. No attempt was made to ascertain how much the applicant knew of general horticulture, but there were twelve carefully prepared questions relating to trees and the way to plant, protect and care for them, so that a comparison of the answers given by the nineteen candidates would, no doubt, enable good judges to select the man whose knowledge on this subject was the most comprehensive and thorough.

The only question relating directly to landscape-gardening was the following: "What is the chief point to be considered in laying out the grounds for a public square?" This might furnish the text for an essay which would enable the judges to learn some of the views of the writer on the general subject of designing small urban parks, but little more than this could be hoped for. Indeed, it would be a difficult task to discover by a written examination whether a man has creative artistic talent. If a city wished to make an intelligent selection of an architect to design a municipal building it would not choose the man who could answer the most questions about architecture. One who wished a landscape painted would hardly think of selecting an artist by competitive examination of this kind. But it requires just as much constructive skill to adjust a piece of ground to varied public uses as it does to make a building which in all its parts shall be adapted to a given purpose, and it requires as much taste, at least, to prepare this ground so that it will make an impressive appeal to the imagination through the eye as it does to make a beautiful

building. By an examination we can ascertain whether a man is a good critic in any branch of art, but it will give no adequate idea of his creative capacity. The proper way to judge of a landscape-architect is by his works, just as we judge of a landscape-painter, or a sculptor or a poet.

Again, if we wish to be informed as to a man's executive faculty—that is, his capacity for administration, for managing men and getting things done in the right way—we naturally study what he has done, or observe what he is doing, rather than cipher up what percentage of his answers to certain questions is correct. A competitive examination conducted by eminent experts was held in one of our large cities some years ago, and the candidate whose papers were easily first in quality was appointed chief gardener of an extensive park system. He had a thorough knowledge of the shrubs and trees and plants used in our parks, he knew how to propagate them and how to cultivate them, but after his appointment it was evident that he had no idea of proper grouping and arrangement, no refinement of feeling, no taste for simple natural beauty. Besides this, he lacked the power of organization and command, and he made a miserable failure.

All this means that while the service in public parks should certainly be kept out of politics, and no one should be admitted to subordinate positions without examination, there is no certainty of securing an efficient administrative head of any departmental work by any such competition. Wherever we need moral power, the force of will, the ability to control others, we must select a man who has displayed these faculties in other positions. And the same is true where artistic talent is in question. A man may be able to write an instructive essay on landscape art without possessing a particle of faculty for original design, just as one may be a competent critic of architecture or sculpture or painting without any talent for invention or construction in either of these arts.

Daffodils in the Grass.

THE different varieties of Narcissi are beautiful anywhere, whether grown in large masses for commerce or in beds in the flower garden, but they never are more attractive than when seen among the grass along a wood border. On the 14th of April a conference on Daffodils, with an exhibition, was held in Regents Park, London, and Messrs. Barr & Son had planted thousands of Narcissus-bulbs in groups of from 150 to 200 of each variety in the turf of the park the autumn before, so that they would be in bloom for this occasion, and the display thus made was said to have been a most interesting feature of the meeting. The cheapness of these bulbs, the ease with which they can be made to bloom, the fact that they can be grown anywhere, on lawns as well as in flower-beds, their satisfying variety in form and color, have made them the most popular outdoor flower in England, and they are rapidly increasing in public favor in this country, although comprehensive collections of all the different sections, including the expensive novelties, are not yet common here. And yet we can grow, with proper care, quite as beautiful Daffodils in this country as any which England can show. Unfortunately, however, our climate is such that not so many of the different varieties can be naturalized in the grass. The Poet's Narcissus, different varieties of the Star section, the Jonquils and some of the Trumpets can be made at home in the grass. Almost any of them will bloom for a season or two, but which particular ones will grow persistently and increase from year to year no one can tell until they have been tested in different soils. Most of the varieties like some cool moist place and in well-drained meadows which are covered with snow most of the winter, and where the soil is a trifle stiff many of them will be sure to succeed.

In the admirable paper of Mr. William Robinson, read before the conference to which we have alluded, he speaks of one menace to the best effect of Narcissi in the grass; and that is the practice of scattering them evenly over a

meadow or pasture. Such monotonous planting destroys all sense of relief and repose. Where one square rod is just like all the rest the eye soon wearies and craves something with distinct features and variety of expression. This suggestion should be heeded by all who attempt the naturalization of such plants as *Narcissus*, *Scilla campanulata* and other bulbous plants in the turf. Just as Water-lilies are much more effective when they are planted in groups with a stretch of smooth water beyond them, so these Daffodils are infinitely more beautiful when there are reaches of grass between the different masses. For this turf-planting does more than furnish individual flowers for our delight. It ought to make a charming picture in the distance. If the bulbs are planted along the border of a meadow, closely here, more openly there, resembling somewhat a picturesque shore-line with capes and bays and detached islets about which the smooth turf flows like a lake, the picture will have some artistic meaning. Mr. Robinson well says that a passing cloud will often give a good form for an isolated group and will be specially instructive since it is more compact toward the centre, as groups of *Narcissi* should be in the grass.

We should like to see more fields and wood borders in this country garnished with flowers in this way. Some of our native weeds naturally arrange themselves into pictures of this kind, but most of them are destructive of the grass crop. The leaves of Daffodils, however, ripen before the grass is fit for mowing, so that the bulbs will be ready for another year's bloom before the machine passes over them. They work trifling harm to the hay crop and yield a harvest of beauty whose value cannot be estimated.

A Botanical Journey in Texas.—V.

EARLY on the morning of the second day of July I left El Paso for a visit to Mount Franklin. This is a vast longitudinal pile of rocks upon gravel and sand, and of sand and gravel upon rocks, and of mud deposits upon both, the whole resting upon granite, which on one side of the mountain is reddish in color, while on the other side, and nearer the river, it approaches white. In some places the granite seems to have intruded into the other material. Mount Franklin itself is nearly isolated, most of the range, of which it appears to be a remnant, having gone down the river to assist in filling the Gulf of Mexico, or having been used nearer home to fill the old lake-like expansion of the river.

Measurements made by Captain Ruhlen, of the United States army, give the mountain an elevation above the level of the Court-house yard of 3,000 feet, and of 6,700 feet above the level of the sea. It is, therefore, one of the highest mountain peaks of Texas. The stories told of the ruggedness of the slope and its difficulty of ascent were fully confirmed by experience. I found no springs of water, and for ten hours wandered in thirst over the mountain. Once in western Kansas I passed thirty hours without food, though with plenty of creek-water to drink, and the recollection of this hardship consoled me, so philosophy triumphed, and my work was probably as well done and as many plants were collected as there would have been if I had been fully watered and fully fed.

Since I visited the mountain to see and to collect its flora and search for rare and unknown plants, the more difficult and unusual way of ascent was taken through a precipitous ravine half-way up the mountain, thence to a different rock formation, and along the crest of the mountain until the topmost crag was reached.

Standing on the mountain-top and looking around for a new plant, the well-known habit of the handsome evergreen Sumach, *Rhus virens*, showed itself at the base of a crag just below me. It is evidently more daring and climbs higher than any of its congeners. *R. microphylla* and *R. trifoliata* are lower down on the mountain. At my feet was the humble *Paronychia Jamesii* and *Selaginella*

rupestris in the crevices of rocks. *Lechuguilla*, *Agave heteracantha*, is by far the commonest tall plant upon the high mountain, and furnishes it with its visible green. Candle-wood and *Solat* are not far below it, all of them ascending to about 6,000 feet. The rather rare and extreme western Pepper-Grass, *Lepidium lasiocarpum*, is common on the mountain, and only there, so far as I have observed it. It is a low apetalous species with hairy fruit, as its specific name indicates.

The most interesting shrub on the mountain is a *Lippia* with rounded crenated leaves and spikes of small white flowers. It is handsomer than *L. ligustrina*, and fully equals that species in the strength and sweetness of its perfume. The general habit of the shrub is like that of *Salvia ballotaefolia*. It is also to be found lower down among the foot-hills. Malvaceous plants are common higher up as well as lower down. Some of them are very handsome. With the rest, *Abutilon parviflorum*, with small yellow flowers, is abundant, especially in the lower ravines. *Pectis angustifolia* and *P. prostrata* are common on the mountain slopes and among the foot-hills. Both species are handsome little plants and lemon-scented. The former extends northward to central Kansas, where its human neighbors call it, by way of nickname, "Camphor-plant."

More species of *Boerhaavia* grow on and around the mountain than I have seen elsewhere. They all are semi-erect spreading plants, peculiar in their habit, their manner of growth, their flowers and fruit. Each is very like the other, and to know one of the species is to know most of them. A low-growing and handsome *Asclepias* is abundant on the mountain. It is probably *A. uncialis*, as it is not more than three or four inches tall. Torrey's *Lycium*, *L. Torreyi*, a tall shrub, is very abundant around El Paso. Its purplish flowers are followed by small red berries, which are used for tarts and jellies. There is another *Lycium* here, a much smaller species, with whitish flowers.

A curious and interesting plant bearing the rather pleasant name of *Janusia gracilis* is abundant in the ravines of the mountains, ascending to an altitude of, perhaps, a mile. It is found also among the foot-hills. It is a low, slender climber with yellowish flowers, which are usually borne in pairs. They are succeeded by samara-like fruits, which readily distinguish the species. It belongs to the family of plants which keep bright the memory of the old Italian botanist, Malpighi, the author of the *Anatomy of Plants* and the father of microscopy. Of larger shrubs on the mountain and among the foot-hills, not already noticed, a *Cercocarpus*, *Fallugia junco*, Crown of Thorns (*Koeberlinia*) are present, and *Ptelea angustifolia*, as distinct from its congener as nature ever makes it, which is not saying very much for its specific rank.

In all regions where dryness of the atmosphere produces aridity of the soil the vegetation is largely limited to quickly growing, annual, deeply rooted bulbous plants and woody perennial plants. In the short rainy season the annuals quickly spring up, blossom, perfect their seeds, and die. The seeds sleep in the soil until the rain comes again, when they repeat the processes of their ancestors. The bulbs, too, sleep, but they are always ready to grow. Within three days after a rain the ground may be literally white with flowers of *Cooperia*, where not an individual was to be seen before the coming of the rain. There is always water in the soil, though it may not be measured. Deeply rooting bulbs and the roots of woody plants are able to reach that water in sufficient quantities to enable them to live and to keep a slow life. The decay of their worn-out roots adds constantly, not only to their stock of pabulum, but also to the stock of fluid to infuse it. The living everywhere are drawing their subsistence from the dead.

Texas, from near the Gulf to New Mexico, is the native place of at least five species of *Ephedra*, a remarkable genus of gretaceous Gymnosperms. All of them are low, humble shrubs, with green and sometimes shreddy bark, and few or no leaves. We wonder that Nature should stop to make such strange freaks of vegetation. We wonder

still more that she should make them so that we literally class them with the mighty Redwood and Sequoia. People who associate strange properties with strange appearances ascribe all sorts of remedial effects to these plants. Most of those are without real foundation. The largest and most peculiar of our species, *Ephedra trifurca*, is very common round El Paso on the mountain and on the mesas. This species sometimes makes itself into a neat little miniature tree, with a clean trunk fifteen to twenty inches long, two to three inches in diameter, and with a round and symmetrical head of branches. People about El Paso and in New Mexico call this species the "Brigham Young Weed."

Larrea tridentata (L. Mexicana) is by far the commonest shrub in this locality among the hills. A bath in a warm infusion of its leaves and twigs is said to be a remedy for rheumatism. In this region plants that depend on rain for their growth have become very easy and slack in their manners and observe no set time to flower and fruit. On the thirteenth day of June the hills around El Paso were yellow with flowers of *Larrea*. Three weeks of rainless weather followed, and the thousands of individuals of that species showed hardly a flower. Other rains came, and in a few days the hills were again yellow with a new crop of flowers.

Western Texas is full of plant wonders, and no plant here is more peculiar and attractive in its own way than the Screw Bean, *Prosopis pubescens*. As a shrub this species outdoes its reputed cousin Mesquit, *P. juliflora*, but the latter far excels the former as a tree. The fruit of the Screw Bean, as its nickname indicates, is a departure in fruit forms, and readily shows the species. Its short, clustered pods are twisted into screw-like coils and again coiled. In the future some daring botanist will again separate generically *P. pubescens* from *P. juliflora*, whose pods, though clustered, are straight and sometimes eight to twelve inches long and containing from six or less to twenty-four or more beans. Uniting these species under the same genus was a complete waiver of the form of the fruit as a generic character.

Euphorbia Fendleri, *E. lata* and other rare species of that genus grow on the mountain, with several *Erigonums*, *Galiums*, a large-fruited *Yucca*, a strange shrub, and other species.

La Junta, Colo.

E. N. Plank.

The Flora of the California Coast Range.—III.

CUPRESSUS MACNABIANA AT HOME.

SIX miles south-east of Ukiah is Red Mountain, and its bold dome, rising 2,300 feet above the sea, is visible from almost any point in the thirty miles of valley which stretches north and south from its base. It is easily distinguished from the surrounding mountains of nearly as great an altitude, by the brick-red soil on all exposed places, which shows enough even in the brushy portions to warrant the name. It is a great mass torn from some other geological formation and set down in a great chain of chemise-covered mountains. It differs from its neighbors no less in flowers and trees than in soil, and is a fine example of these isolated sections which are a feature of our state. Forty miles to the east, across two higher ranges, is a region in which the geological conditions and flora which distinguish Red Mountain are reproduced on a greater scale. The mountain is almost completely detached from the main range by a stream which, rising on the north-west face, completely encircles and drains the mountain.

The eastern side of Red Mountain is covered with the most curious forest I have ever seen. A body of *Cupressus Macnabiana*, about a half-mile square, and scarcely mixed with any other tree, covers it completely. The trees are only from twelve to twenty feet high, as a rule, but, like the miniature trees of the Japanese gardeners, they have all of the appearance of great age. Old and gnarled, tough and twisted, covered with moss, and with limbs broken, they look like the old forests of Cedar of Lebanon as they are pictured. A forest a hundred feet high, looked at

through the large end of a telescope, would give the same impression. A fire has swept through one side, and the old trunks, standing black and naked, aid the deception. Only the surrounding objects by which to aid the sight, keep one from being quite carried away by the deception. These trees, dwarfed so strangely by the arid soil and bleak climate, are very old.

The west face of the mountain is no less curious. Here the Cypress forms a dense thicket, from six or eight feet high in the open hills, to fifteen feet high in the gullies, and stretching over the whole mountain-side till it breaks into cliffs at the cañon. Where the fires have burned over, the little seedlings, are coming up, but in no such profusion as I saw in the thickets of *Cupressus* on the coast. Here, at the most, there would be one tree in three or four feet. The little seedlings having the soil to themselves, are of a fine green and quite shapely, and many grow into handsome trees. A few seeds carried down the stream to gravelly flats in the valley have formed an open grove of specimens as handsome as any in a park of perfect pyramidal form and very broad at base. Handsomer trees are seldom seen.

Many of the lesser shrubs and flowers are quite as distinctive of Red Mountain as the Cypress. One *Ceanothus* in particular I have never observed except in such soils. It is much like a Holly in leaf, and forms a low bush. The flowers are white. The stream which flows down the east side has a broad bed heavily grown with a coarse grass which retains the soil and furnishes a home for many flowering plants. For fully a half-mile *Lilium pardalinum*, in a large spotted form, grows in abundance and forms great clumps. As I have seen it in July, the stem four to seven feet high and the cañon fairly filled with a wavy mass of the grand recurved red and gold blossoms, I thought it the finest floral sight I had ever seen. Our common Columbine, *Aquilegia truncata*, is a fine plant and the parent of some good garden plants. It flowers in May and June. In the grass and on the wet rocks of the numerous little falls a form with viscid leaves grows in profusion, and, unlike the type, blooms constantly through the summer season. The flowers are more of an orange color than the type. A variety of *Stachys*, with tomentose leaves and a pleasant fragrance, is almost as common, and in the wettest places one can see large beds of an Orchid much like a small purple and brown Lady's-slipper. This is *Epipactis gigantea*, a pretty species well worth cultivation. A large clump graces my Fern-bed, and rapidly increases, blooming freely every year.

Few Ferns grow here, but a *Pellaea* (*P. densa*) is abundant in the loose rock which has broken from the cliffs above, and in the rock crevices as well. It grows in large bunches, and the small dissected fronds are quite handsome when the winter rains wake them from the long summer sleep; very delicate, too, the light green new growth resembling a Maiden-hair. *Calycanthus occidentalis* is not uncommon in the Coast Range and is one of our finest waterside shrubs. It is rather prettier than the eastern *C. floridus*, and, like it, the bark, leaf and fleshy chocolate-colored flowers have a pleasant odor. It especially likes the clayey soil of this cañon, and in some localities the growth is ten to twelve feet high and completely fills the gulch. In clefts of the rock a rare *Brodiaea* grows quite out of its range, for it is common forty miles eastward. The flowers are white, and it prefers the courses of streams.

The higher slopes are also rich in rare plants. One of the most attractive is *Dendromecon rigidum*, a shrub from two to eight feet high, slender, with light lance-shaped leaves and a blossom almost exactly like a light-colored Californian Poppy, except in size. This beautiful Tree Poppy in our region is confined to high altitudes. A well-developed bush is not soon to be forgotten. Morning Glories are everywhere in our state. A very common one with good-sized white flowers grows in grain fields and is a troublesome weed, pretty as it is. Red Mountain, in

Morning Glories, as in everything else, is odd, and the creeping form which I saw in bloom one morning in May had halberd-shaped leaves densely clothed with woolly hairs and a fine white flower. The stem crept about a foot.

Ukiah, Calif.

Carl Purdy.

The Reproductive Powers of Our Forests.

AT the present time the guard ranges of the Alleghany Mountains, which extend into Monongahela County, West Virginia, are covered with a mixed deciduous forest of second-growth trees. This is one of the best examples that have come under my personal observation of the natural power of forest reconstruction. During the early half of the present century this region, embracing several thousand acres lying along the north bank of the Cheat River, was the seat of an active iron-making industry. The mountains afforded a bog ore which was accessible and of great value. The mountain slopes were then heavily wooded, and as the iron industry became established a demand for charcoal was created, and to meet this demand the woods were harvested and converted into charcoal. This industry began about 1789, and was most active from 1822 to about 1852, and continued in a small way until in 1868. The largest proportion of the timber removed for charcoal purposes was cut during the most active period of the industry and before the middle of the century.

As soon as the charcoal burning became unremunerative from the exhaustion of the timber supply and the substitution of coke for charcoal in the reduction of ore, these lands, which were too steep and rugged for profitable agriculture or grazing, were allowed again to fall into the hands of Mother Nature. It is true that fire has done much injury from time to time, but even with the adverse conditions of soil, exposure and frequent fires, there is to-day upon these mountains a forest of second-growth Chestnut, Poplar and Oak worth many times the value of the land at the time the iron furnaces closed—a convincing example that our forests will reproduce themselves. This we are told is all well enough for the moist mountain districts of the Alleghanies, but will not hold in the deforested areas of Michigan, Wisconsin and Minnesota. There is no ground for this argument, for when the forests were removed no rational system of reforestation was attempted. Even the protection of the area from fire has usually been neglected, and this alone will suffice to explain why the land stripped of its forest-cover still remains bare. Natural reproductive powers have not been allowed an opportunity to assert themselves. Trees cannot grow so long as fires are allowed to run periodically over the exploited tracts; what might take place, were they suppressed and prevented, is another question upon which some light is thrown in the following remarks by Mr. H. B. Ayers, of Carlton, Minnesota, on Forest Fires*:

Even men of intelligence and prominence in the lumber business have said, "Why prevent fire? Pine will never come in again after the marketable timber is once cut." This assertion needs the strongest possible denial; the men who make such an assertion deserve ridicule. They were looking for saw-logs, and could not have looked for much else, for loggers in cutting often leave on an acre a hundred thrifty and vigorous young Pines from four to ten inches in diameter and from twenty to a hundred feet high after the log-timber is cut, and on pine-stump land that has escaped fire three years thousands of little Pine seedlings may be seen springing up. In order to be able to refute such misstatements utterly I have here the minutes of the exact location where young Pines in excellent condition for timber-growing may be seen, and right by may be seen burnt land cut the same year that could not be put into a condition as promising for timber for less than twenty dollars an acre. In fact, so favorable a soil, mulch and shade can hardly be made at once on that burnt land at any price. Several such acres on (sections) 16, 56, 22 were staked off and the trees counted; on one from which 32,000 feet had been cut three years before were thirty-two thrifty sapling White Pines, eight to eleven inches in diameter and thirty to eighty

feet high; ten Poplar, eight to fourteen inches in diameter and sixty feet high; 1,600 Poplar sprouts, one-half to one inch in diameter and five to twelve feet high; a light underbrush of Hazel and Vine Maple; and under all this were 1,267 little White Pine seedlings two years old and four to six inches high. Another acre on the same section had 200 trees of White and Norway Pine averaging eight inches in diameter and forty-five feet high. Are not these worth saving?

This is a specific example of what may be expected from one of the families of trees which it is most difficult to perpetuate. Pines, as a rule, grow only from seeds; they cannot be managed under the coppice system, yet this single observation, carefully carried out and recorded, is sufficient to set the most skeptical to thinking.

In the deciduous forests which occupy the outlying ranges of the eastern mountain systems the problem is less difficult, as most of the desirable species readily reproduce themselves from the stump. The accompanying illustration (see page 235) shows what may be accomplished if only a little care is given, the forest represented being of Chestnuts about forty years of age. I have other photographs to represent the reproductive powers of the Ash, Magnolia and other species.

The history of this region clearly shows the influence of the rise and decline of the iron industry on the forest, the benefit of the substitution of coke for charcoal and the beneficial results in the way of reforestation when such lands are simply left to themselves and partially protected from fires.

Agric'l Experiment Station, West Virginia.

L. C. Corbell.

Plant Notes.

TOXYLON POMIFERUM.—Since the recent rains the large leaves of the Osage Orange-trees in Central Park have expanded to nearly their full size and have begun to take on the gloss which is characteristic of them, and few trees of their size have a more pleasant expression at this season. Downing says of this tree that it is rather too loose in the disposition of its branches to be called beautiful, but it often grows in a compact spreading shape, and owing to the size and the abundance of its leaves it casts a dense shade. Although it grows in parts of the Indian Territory and Texas where the temperature is comparatively high, it will flourish as far north as New England, and, in spite of the fact that it has been developed in the region of abundant rain, it also flourishes on the dry prairies of the west. Besides its hardiness, the tree grows rapidly and is subject to few diseases and insect enemies, so that it is, altogether, desirable for ornamenting parks and gardens. The pistillate trees have large orange-like fruits, which add to their beauty in the autumn, and it has a certain half-tropical or foreign air that arrests the attention. It is easily grown from seeds and cuttings, and is much used for hedges. In this latitude some of the trees reach a height of forty feet, and with almost as great a spread of branches, but in the valley of the Red River they grow sixty feet high, with a trunk two or three feet in diameter.

VIBURNUM MACROCEPHALUM.—This plant bears larger snowballs than either of the other species or garden forms which bear cymes of pure white sterile flowers. In an early volume of GARDEN AND FOREST Mr. Hemsley wrote that wild specimens of *Viburnum macrocephalum* were sent to him by different collectors in China, in which but few of the outer flowers were neuter, but the plant is only known here in its sterile form, and it has been grown in England ever since Fortune discovered it in the gardens of Shanghai. The flower-clusters are as large as those of *Hydrangea hortensis*. It differs somewhat in habit from the other Snowballs, being rather low, of rigid and widespread branches. It is hardy enough to survive the winters in New England, but it does not flourish there as it does in Philadelphia and southward, where the flower-clusters often reach six inches in diameter, making it one of the most conspicuous of flowering shrubs. The old-fashioned Snowball, or the sterile form of *V. opulus*, is rather the most graceful

* Minnesota State Horticultural Society Report for 1895, pages 443-9.

plant of the three, but the Cranberry Tree, its fertile form, is still more desirable, just as *V. tomentosum* is more beautiful than its sterile form *V. plicatum*. The wild form of *V. macrocephalum* has never yet been introduced to cultivation.

CAMASSIA CUSICKII.—This species was figured in the first volume of *GARDEN AND FOREST* (see page 174), and experi-

this purpose. These flowers are nearly white when they open, but they turn to a pale blue. Like most bulbs this *Camassia* delights in an open or sandy soil, and it is especially necessary that the bulbs of this species, which are sometimes as large as a hen's egg, should be planted deeply. The common *C. esculenta*, the edible Quamash of the Indians, is a smaller plant altogether, and not nearly as



Fig. 34.—Second-growth Chestnut-trees, in West Virginia.—See page 234.

ence has proved what was then predicted, that it would be an excellent garden plant. It is perfectly hardy, and after a winter which has proved so disastrous to many bulbous plants this native of the west has been flowering well on spikes two feet high, with sometimes as many as forty narrow-petaled, star-shaped flowers on a single spike. They keep well when cut, and the plant can be commended for

hardy as *C. Cusickii*, although it has a variety, *Leichtlinii*, with creamy white flowers two inches across, large leaves and robust stems, which seems able to withstand our winters without protection. *Leichtlin's* *Camassia*, however, does not open its flowers until late in the afternoon and blooms in the evening. *C. Fraseri*, sometimes called the wild Hyacinth, has an almost naked stem and a short spike

of pale blue flowers at the summit. This species flowers better in full light, but the flowers fade quickly in the sunlight. *C. angusta* has also been cultivated here, and it makes a good hardy border plant. The *Camassias* belong to that section of the Lily family which includes the Hyacinth, the Grape Hyacinth, the Star of Bethlehem and the Scilla, to which species it is nearly allied, although it has a stouter habit and a leafy stem. Most of the species have grass-like leaves rising from the base of the stem, and, with the exception of *C. esculenta*, they are hardy plants which need no extra care or coddling.

Cultural Department.

Notes from the Herbaceous Border.

THE most showy of the early yellow-blossomed *Compositæ* is *Helenium Hoopesii*. This compact, handsome plant is perfectly hardy without protection in the winter. Although it grows as freely and is as easily raised as *H. autumnale* and its varieties, yet it is not so common in gardens. The plants produce seeds freely, and if they are sown early in spring and the young plants are well attended to during the summer and fall they will make good large-flowering plants for the following year. This fine *Helenium* thrives here in an open position and in a rich open soil. The height of the plant is not much over two feet, but with good culture it attains a height of three feet. Its stems are well clothed with leaves; their sturdiness is very useful in plants of this height, as no staking is needed. Sometimes the flower-heads are produced singly, but oftener several on a stem. The flower-head is of a bright orange color and measures fully three inches in diameter. This is a native plant and was named in honor of Thomas Hoopes, who first collected it.

The *Columbines* make a fine display now. The genus *Aquilegia* has many species, and every one, with all varieties, is worthy of a place in any garden. Perhaps the different species belonging to this genus are more easily cross-fertilized than any other in the garden; hence the great difficulty in getting plants true that are raised from seed where a collection is grown. To get the seed true the plants ought to be grown in isolated places, and even then there is no certainty that insects have not been at the work of crossing. In our wild garden, although it is quite a distance away from our general collection of *Aquilegias*, I see this year that *A. Canadensis*, the only species grown there, has been cross-fertilized with some other species, probably with *A. vulgaris*, from the appearance of the flowers and foliage of some of the seedlings in bloom now. The *Aquilegias* grow freely here, with the exception of *A. glandulosa*, and this plant never looks happy here. I have raised it several times from seed; the plants grow and blossom once and then dwindle away and die.

The Rocky Mountain Columbine, *Aquilegia cœrulea*, is, in my estimation, the most delicate and most beautiful species in this lovely genus. It grows here from one to two feet high, the height of the plants varying in different parts of the garden. They are neat and compact, and when two or three are planted in a clump they are very pleasing when in bloom, and before they blossom and afterward the much-divided foliage is distinct and graceful. The flowers are produced plentifully for four or five weeks, and are of a sky-blue color. The sepals are sky-blue, ovate in shape, spreading, and measure fully one inch and a half in length. The blades of the petals are white and about half the length of the sepals, but they are elongated into a long, narrow straight spur which measures nearly two inches in length and is also of a blue color. Most of the plants that are in bloom now of this Columbine were raised from seed which was collected in the Rocky Mountains. It makes a choice border plant, and is also very suitable as a rock-garden plant. *A. Canadensis* is the most floriferous of all the *Columbines*. It produces young plants very plentifully in our rockeries from self-sown seed. *A. viridiflora*, a Siberian species, is not a showy plant, but its flowers are greenish, and therefore of an uncommon color, and it is worthy of a place in the rock-garden. *A. vulgaris* and all its varieties grow well here. At this time a small bed of plants that were raised from seed last year is making a very pleasing display. This showy plant is as much at home here as it is in Europe. It grows just as well under the shade of trees as it does where it gets plenty of sunshine. There are many varieties of this Columbine, and most of them have pleasing colors. Some of the double-flowered varieties are very showy. *A. atropurpurea* makes a bold plant, growing to the height of

two feet or more, and it has dark purple flowers measuring about one and a half inches in diameter when fully expanded. It makes a good border plant, growing freely in a light, rich soil. The double-flowered *A. Sibirica* is useful when planted in the second row from the front of the herbaceous border. Our plants are about eighteen inches high, and the erect, dark purple double flowers are very distinct from all the other *Columbines*. There are many others in bloom, such as *A. cœrulea lutea*, *A. attrata*, *A. Caucasica* and *A. oxyacantha*.

In a slightly shaded place the Globe-flowers have been blossoming for two or three weeks. They grow best here in a deep, rich, damp soil. *Trollius Asiaticus* has a compact habit and a height of twelve to fifteen inches, and it bears its golden-yellow flowers in great abundance. This plant does not produce seed readily, but it is easily increased by division of the roots. It comes from Siberia and is quite hardy here. The European Globe-flower, *T. Europæus*, blossoms also at this time. Before its flowers appear the plant looks like a *Ranunculus*, but when in bloom it is easily distinguished by its pale yellow globular flowers.

The Snowdrop Anemone, *A. sylvestris*, is a compact, perfectly hardy and very reliable perennial. Its large pure white flowers are produced singly above the foliage. *A. Pennsylvanica* is not very satisfactory as a border plant, but in the wild garden it makes a splendid mass of white. It ought to be given plenty of room, as it spreads rapidly after it gets established. The Japan Anemones have proved very unsatisfactory here for the past two years. Many of our plants have been winter-killed.

The beautiful Iceland Poppies are very floriferous. They do not thrive as well here in the border as they do in the rock garden. To have them at their best in the border the ground must be well drained, so that water will not remain about the roots in winter. They multiply rapidly here from self-sown seed.

For an early summer-flowering plant nothing in the border has the grace and beauty of well-grown specimens of *Dicentra spectabilis*. Not only has this plant beautiful flowers, but it has handsome Fern-like foliage. Like many other perennials, it does not show its beauty and habit well until it gets large and well established. Some of our plants measure four feet in diameter, and they are exceedingly handsome when in flower. It is so common that many persons affect to despise it, but there is no other plant which can fill its place at this season.

In an open position in the rock garden a large patch of the hardy and free-growing *Erysimum pulchellum* is completely covered with sulphur-yellow flowers, which give a welcome distinctness of color along the front row of the herbaceous border. When it is in blossom the plant measures about a foot in height and is very compact in habit.

Lunaria biennis, hardy biennial, as its name implies, and better known by its common name of Honesty, is well worth growing for its large terminal racemes of violet-lilac flowers. After these are gone the silvery flat seed-pods are ornamental. The color of the flowers is uncommon among hardy plants at this time, and they are a very welcome addition. Plants raised from seed in spring if planted out in the garden in light warm soil bloom the succeeding summer.

The Horned Pansy, *Viola cornuta*, and its varieties are blossoming now, and will produce more or less flowers all summer. *V. lutea* is another hardy Violet that grows well here and blooms all summer. *V. Munbyana* was raised from seed last year and planted out in the border. It lived through the winter unprotected, and has been in flower for the past month. It is a strong-growing plant and has violet-colored flowers as large as those of *V. cornuta*. It is an Algerian plant. Another beautiful little Violet now in flower is *V. declinata*, var. *losisepala*. The seed of this plant came from Sweden last year. It has proved quite hardy here, and in a slightly shaded spot it is blossoming freely. It is a low plant, about six inches high, and has small Pansy-like flowers. The color of the flowers is very uncommon, it being of a dark pink.

Along the front row of the border there are some compact dwarf plants of *Gypsophila repens*, producing immense numbers of small white airy flowers. This is also an important plant for the rock garden. The rosy pink flowers of large masses of *Saponaria ocyroides* contrast well with the white ones of this *Gypsophila*. *Cerastium arvense* makes a fine mat of white close to the ground, but if used in the border it must be kept within bounds. A near relative of the *Cerastium* is *Stellaria Holostea*, which makes a much better plant for the front row of the border. In fact, it is the best dwarf white-flowered plant we have in the border since *Arabis alba* ceased blossoming.

Although *Linum perenne* is not a very robust plant here, when it once gets established it makes nice shapely plants,

which are crowned with fair-sized flowers of a pale blue color. A white-flowered variety in bloom seems to be more robust than the typical plant, and is very attractive.

Thermopsis mollis is not often seen in gardens. Although it comes from the mountains of south Virginia and North Carolina, it is quite hardy here, and gives perfect satisfaction. Its habit is almost perfect. When well established it makes compact bushy specimens a yard high. The flowers are yellow and produced in long, nearly erect racemes, and they last in good condition for two or three weeks. In a slightly damp soil and away from the shade of trees it grows freely if not too often disturbed.

The best early *Salvia* is *S. pratense*, a handsome European plant, which grows as freely as our commonest weeds. It is about two and a half feet high, and the flowers are produced in whorls of four to six flowers in spikes from twelve to eighteen inches long. The corolla is bright blue and measures one inch in length, the upper lip being much arched and the lower one broad. There is also a white form of this plant in bloom which is showy, making a good companion for the blue one. This, too, is a thrifty plant, growing well in any common garden soil.

The Japanese *Primula Sieboldii* is one of the most satisfactory and one of the most decorative of *Primroses*. It grows best in a warm sheltered position, where it is covered with leaves in the winter. The flowers last much longer in a place where the sun does not strike them during the hottest part of the day. There are some large clumps of this *Primrose* now at their best, and much admired by visitors. Since it was introduced from Japan in 1865 many varieties have been raised. The flowers measure more than an inch across and are produced in umbels on stout stems from nine to twelve inches high. Each variety has a different shade of color, and those grown here are of different shades of rose. The roots creep just below the surface of the soil, and they form buds, thus giving an easy means of increasing the plants, and if it is provided with a good situation and proper soil this *Primrose* grows rapidly.

Botanic Garden, Harvard University.

Robert Cameron.

Flower Garden Notes.

THE recent showers have made a great improvement in the borders and made it possible to plant out annuals to be added at this time for effects later in summer, when most of the perennials are past. This arrangement has, in past seasons, proved desirable for the best results during the entire season. Mixed borders are superseding herbaceous borders and include bulbs for the early spring. A border made up in this way will be interesting from April until November frosts.

The best feature of the garden now is the set of the more recent Japan Tree *Pæonies*. We have added twenty of these, and they are a great advance over the older ones, which are mostly shades of pink, and I suspect are in many instances nothing more than the stock used by the Japanese for grafting. The newer varieties are of all colors, from pure white to deep rose, and some are single, beautiful, large cup-shaped blossoms of purest coloring. They are a decided acquisition in the garden at this time, and, no doubt, will prove as hardy as the older varieties. It will, however, be safer to draw the earth about the stems in the fall for the first year or two, to avoid loss, before they are well established. I find that all of these plants are grafted, cleverly as usual by the Japanese gardeners, but they do not seem to have been wise in the selection of the stock; it shows decided tendencies to sprout from the roots. These sprouts would soon choke out the better scion if allowed to grow, and planters must use care that this does not occur. This is the only thing that can be said against these plants, and it may be remedied in later importations by the use of some stock that is not so apt to send forth shoots from adventitious root-buds.

The hardy native *Orchids* are mostly intractable under cultivation, beautiful as they are when growing wild. They all need special care in the selection of positions in the garden if any success is to be had. Two of the *Cypripediums* are quite reliable, or at least we have found them so for the past five years, planted on the shady side of the *Rhododendron* beds. *C. pubescens* is now beautiful, and *C. spectabile* will follow later. The latter is the most lovely native *Orchid*, and few exotics of this genus can compare with it. It is all the more satisfactory to know that it can be cultivated in gardens in moist black soil, such as *Rhododendrons* delight in.

Baptisia exaltata is now fine. It is not a common plant, though *B. australis* is often seen in gardens. *B. exaltata* is much taller, with larger flower-spikes, and is altogether the

better plant. It is a good companion to the *Lupins* that are now at their best. *Lupinus polyphyllus* gives a great variety in itself, the white form being in pleasing contrast with the various shades of blue and purple. I find it is necessary to save seeds of the best varieties and sow them. The parent plants seed freely, and these seeds germinate in the borders, but the self-sown plants deteriorate and the better varieties are soon lost in this way.

Many of the earlier-flowering plants are dying down now, and it is a good opportunity to plant near these such annuals as are desired to cover the space for the balance of the summer. The frequent showers will enable them soon to take root, and little care will then be needed in the borders, except to keep down weeds.

South Lancaster, Mass.

E. O. Orpet.

Herb Robert.

COMPARATIVELY few flowering plants mingle well with Ferns on rock-work or in the wild garden. Of these our native Herb Robert has no superior. Its dainty pink blossoms peeping out here and there among cool green fronds add just the warmth of color needed. The chief beauty of the plant is in the delicate design and varying color of its much-divided leaves, which are pale green in early summer, deepening into richer tones as the season advances, but always fresh-looking. Leaves with rich autumn colors are to be found at all seasons, and they often tempt the botanist to a hard climb for an unknown blaze of color just out of reach. For indoor culture the plant has considerable merit. In December a few young plants which had been frozen stiff were taken indoors; none of them wilted and nearly all proceeded to grow with more or less enthusiasm. One of them on a platter with Mosses and Ferns, and left pretty much to itself, was a great success, and its branching stems attained a spread of forty inches with no care save an occasional sprinkling and clipping of seed-pods before they matured. Herb Robert attracts us to-day by its delicate beauty, but the old naturalist valued it chiefly because of its supposed medicinal "vertu" in the disease known as "Sir Robert's Plague," from which it is said to have derived its name, *Geranium Robertianum*. The significance of *Cranes-bill* is obvious. The Scotch Highlanders are responsible for the uncouth title of "Red Shanks," given in reference to the lovely red stems which support the leaves. Another name of grave significance for this shy wildling is *Death-come-quickly*, and in Northumberland lore to uproot or find a plant uprooted is considered a forerunner of fate.

Pittsford Mills, Vt.

G. A. Woolson.

Correspondence.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—Our Japanese Weeping Cherry has been flowering ever since its proper blooming time in April, and is in blossom in June, when our sweet cherries are ripe. In April the lower limbs hung out a few half-blighted blossoms, while the upper part of the tree showed no signs of life. It was badly injured by the cold of last winter, but has been gradually recovering and opening its flower-buds from the lower limbs upward, until now only the top of the tree is bare. The blossoms are a sickly pinkish white, and open a few at a time as the tree recovers strength. Thunberg's *Spiræa* failed to bloom from the same cause, but the Double-flowering Peaches were very fine. Hard-shelled Almonds bloomed, and so did Nectarines, while Apricots of the same age, and in the same enclosure, did not have a flower. *Magnolia Kobus* and *M. Soulangeana* were full of bloom at the usual time, showing their great power of enduring cold. *Paulownias* seldom flower with us, and only after an unusually mild winter. This year only a few of the flower-buds matured, a cluster of buds displaying but one perfect flower, the rest shriveling up without opening.

In spite of the vagaries of the weather, it has been a good season for gardening purposes, and the *Roses* are unusually beautiful and profuse. A group of *Penzance Sweetbriars* planted this spring and last year is making rapid growth. These hybrid *Sweetbriars* are not as fragrant as the type, and the flowers must be beautiful, indeed, if they are really an improvement on the *Eglantine*. The latter is now sprinkled with its dainty pink cups, to be succeeded later by showy pips, which give it a new beauty even when winter shall have robbed it of its last fragrant leaf.

Sweet Williams are making the flower borders bright and gay. There are almost too many magentas and dull crimsons among them, but the light and the bright pinks and the deep

red kinds, mixed with the white and Auricula-eyed varieties, make a very cheerful group. The Sweet William is one of the flowers that one associates with cottage gardens and with thrifty and happy homes. It appeals to old association, to memories of our youth, and flourished along with hardy Pinks, Columbines, Everlasting Peas, Lilies-of-the-valley and Wallflowers in the gardens of our childhood. No rare novelties will ever quite take the place of these old favorites.

The early Mock Oranges are out of bloom, but a very beautiful specimen, which was labeled *Philadelphus Yokohama* when it came from the nurseries, is now flowering profusely. Its bloom is delicately fragrant, and the flowers are larger and of a purer white than the commoner kinds. The expanded flower measures an inch and a half across. This *Philadelphus* is one of the most beautiful shrubs at Rose Brake.

In the wild and rock gardens the Yellow Lilies are still very showy, and the Orange Lily is very effective in a bold group against a background of shrubbery. The cold, damp weather of last May lengthened the blooming period of this Lily, which has been flowering for three weeks, but is now nearly over. More delicate beauties are the little groups of *Tunica Saxifraga* and the pretty pink *Lychnis Flos-cuculi*, which also remains in bloom a long time.

Honeysuckles and Roses are making the air fragrant, and one opulent *Magnolia*, *M. glauca*, with its rich odor and creamy cups of bloom, claims our admiring homage as queen of the week.

Shepherdstown, W. Va.

Danske Dandridge.

Some Rare Erythroniums.

To the Editor of GARDEN AND FOREST:

Sir,—In 1891 the late Sereno Watson published his revision of the American *Erythroniums*. Mr. Watson gave a very careful study to the subject, and his work gives the student a safe guide, although in one or two instances his species seem so close together that only the skilled observer can distinguish them. No really new species have been added since Watson's revision, but several good color forms have been brought to light, of which *Erythronium Johnsonii* is the most notable addition to the flower garden. It is to be expected that a thorough exploration of the forests of the Pacific slope will bring to light many color forms, if not new species. Few know what vast tracts of the north-west have never been explored at all by trained botanists. Nothing emphasizes this so much as the fact that many species collected by the early explorers have been lost sight of and have come to be considered as mythical. I have found several species of great beauty which were not in any of the great herbariums and were thought to be errors of the authors. Even in localities near the homes of skilled observers, species are sometimes so local as to be easily overlooked.

Perhaps the most striking of the Pacific coast *Erythroniums* is the group related to *E. revolutum*. Only one of this group is much known in our gardens. *E. revolutum*, var. *Bolanderi*, better known as *E. Smithii*, has long been in cultivation. Of the others, a few of *E. Johnsonii* were sent out last year, and the rest are unknown in the garden.

To be appreciated properly the *Erythroniums* should be seen in their own homes; in the shaded cañons among the wood plants, with their mottled leaves of immense size, almost as beautiful as the flowers, and their tall graceful scapes and lovely lily-like flowers, I can imagine no more beautiful mass than a large bed of these Dog-tooth Violets.

In all of the *Revolutum* group the leaves are mottled; in the type and *Erythronium Johnsonii* the mottling is in rich brown or mahogany; in the others in green and white. As compared to the *E. giganteum* group, the scapes are stout, the flowers have more substance, and the petals, while recurved, yet more widely spreading; the stamens have broad awl-shaped filaments, and the auricles at the base of the inner petals are very prominent in all of the group and pressed closely to the filaments. *E. revolutum* and its varieties are hardly as graceful as the exquisitely formed *E. giganteum* (*E. grandiflorum* of our gardens), but excel it in the substance and coloring of the flowers.

Erythronium revolutum (type) is a plant of medium size, leaves mottled in mahogany, scape one to three flowered. In color it varies from almost a pure white, with a most delicate greenish caste and brown and purple markings at base of petals, to a rich yellow similarly marked.

Erythronium Johnsonii is in leaf and habit the same, except that in my own garden it is one-flowered. In coloring the flowers are a bright clear red, shading to dark red toward the middle, and the centre a fine orange.

Erythronium revolutum, var. *Bolanderi* (*E. Smithii*), is a native of the Redwood forests of the northern part of Mendocino County, California. Its northward range has not been determined, as from its own habitat an almost unknown (botanically) region stretches to the north. This species is of low habit, the leaves mostly mottled in white, seldom more than one-flowered, and the widely spread blossoms opening a pure white and at last becoming purple.

I had the pleasure this spring of discovering a new variety of *Erythronium revolutum*, or, perhaps, only rediscovering this beautiful plant. Its leaves are mottled in white and green. The scapes, as I saw them in large beds, were tall, ranging from ten inches to nineteen inches high. The petals are narrower than in the other forms of *E. revolutum*. Of those seen a very few were white, deeply suffused with pink, on opening, and soon changing to a deep wine-purple. In by far the greater number of instances they opened up a delicate pink, and turned while still fresh to wine-purple. This is the largest of the group.

Its home is in the Redwood region of Mendocino County. In a note in his revision Watson says about *Erythronium revolutum*: "Described by Smith as having purple flowers, and an original specimen in Herbarium, Kew, bears the note by Sir W. J. Hooker, fl. rubr. purp., but it is rarely that the petals assume the purple tinge in drying, and the ground for the statement is unknown. No purple-flowered species is now found on Vancouver Island where Menzie's specimens were collected."

My new form corresponds very closely to Smith's description, and I have no doubt is identical. It is certainly strange if the counterpart of a species collected over a hundred years ago, and not since seen, should be found so far away.

Ukiah, Calif.

Carl Purdy.

The Increase of Redwood Forests.

To the Editor of GARDEN AND FOREST:

Sir,—In an article in your paper a few years since I called attention to the rapidity with which the woodlands in the Coast Range of northern California are encroaching on the grassy and brushy portions. Close observations since and conversations with many observing people confirm my statements. A point upon which I did not then touch was recently brought to my notice in a conversation with an intelligent pioneer. The Redwood forest of to-day is a tangle underfoot and a mass of broken limbs and fallen trees, all overgrown with Huckleberries and various *Ceanothus* and other undergrowths, which make travel, except by roads or trails, almost impossible across country. The pioneer referred to tells me that in the earlier days a man could go by horseback from the valleys in the interior to the coast in almost any direction, as the woods were almost free of undergrowth. He was told by the Indians then that they made a yearly practice of firing the grass—I presume, both to drive out the game and to clear the way. Now roads in every direction cross the forest belt, and the interests of the settlers are against sweeping fires, so that they are becoming less frequent with each year.

Here in the valleys the interest of every sheep rancher is against fires, and they do not sweep through close-cropped ranges as they did when the grass grew waist-high.

Ukiah, Calif.

Carl Purdy.

The Wild Garden.

To the Editor of GARDEN AND FOREST:

Sir,—No spot in the flower garden yields me as much pleasure as that which is devoted to the native plants which I gather from the woods and fields. While the Crocuses were yet in bloom, the snow-white blossoms of the Bloodroot appeared, quickly followed by the Dog-tooth Violet and the beautiful little *Dicentra cucullaria*, or Dutchman's Breeches. Soon after these followed two species of *Trillium*, and then the sky-blue Lungwort, *Mertensia Virginica*, with *Phlox polemonium* and different Violets. By the middle of May the feathery spikes of *Tiarella* were giving place to the graceful native Columbine and Sweet Cicely. Aside from the beauty that this plot furnishes, here is an opportunity for studying the habits of various plants which one does not enjoy unless they are constantly under the eye. The most interesting problem is the constant struggle for existence or for mastery among them. If let alone, the wild Columbine, *Viola cucullata*, *Thalictrum cornuti*, *Geranium maculatum*, *Lysimachia quadrifolia* and *Onoclea sensibilis* will soon smother out their neighbors. Lungwort, Bloodroot, Moon Seed, some of the Vetches, Spring Beauty, Dog-tooth Violets, some of the Ferns like *Osmundas* and

Aspidiums, will increase rapidly, and yet they are not objectionably aggressive. Trilliums, the low Phloxes, Cypridium pubescens, Liliun Canadense, Dicentras and the delicate Maiden-hair Fern will increase more slowly, and yet at a sufficient rate to show that they are permanently established. Of course, to keep up the variety one must be constantly thinning out the more aggressive varieties and give aid to the more modest ones.

Harmonsburg, Pa.

B. L. P.

Recent Publications.

The Bamboo Garden. By A. B. Freeman-Mitford, C. B. Illustrated by Alfred Parsons. Macmillan & Co.: London and New York.

In the great family of Grasses there is no more interesting group than the Bamboos, some of them giants a hundred feet or more high and others pigmies of the humblest proportions, but all distinguished by a characteristic grace which makes them as beautiful as they are generally useful in the regions where they thrive and where the whole social and industrial economy of the people are associated with and dependent upon them. Where they abound they largely help to give character to the scenery, but here in the north there are hardly more than half a dozen which are reliably hardy. In the soft and moist airs of England a greater number of species will thrive, and all who are familiar with current garden literature have read the instructive writings of Mr. Mitford in the *London Garden* and elsewhere. He has been an enthusiastic student and cultivator of all these plants that can be made at home in England, and this beautiful book is the result of his many years of labor. It has been illustrated by Mr. Alfred Parsons, whose drawings give a fair idea of the decorative quality of the different species. We cannot help but think, however, that it would have been better to have something more accurate, even if less artistic figures that would, at least, enable one to identify the various species. Even the reproduction of photographs would have been more useful in a treatise of this sort, although these always lack something of æsthetic value. Chapter I. gives an interesting account of the plants in general and of their characteristics, especially as they appear in cultivation; and this is followed by minute directions on the methods of propagation both by seed, by division, by cuttings from the base of the culm, and by pieces of the rhizome. In writing of the choice of position, Mr. Mitford not only explains the quality of the soil, exposure and cultivation which the plants need, but he explains how to plant them for producing the best effect. On this point he says: "A good background is of the first importance to show off the beauty of the Bamboo. A bay in a clump of Hollies or conifers will afford a most appropriate setting. The tall columns waving their dainty green foliage against such a backing under a gentle summer breeze are the embodiments of all that is graceful, while the tender leaves look like a flight of delicate green butterflies hovering in the air. A group planted on a lawn may be effective, but Bamboos are seen at their best when their bending columns are shown in contrast against softer and darker foliage." It may be added that suggestions of this sort as to methods of planting in an effective manner are scattered all through the book, so that there is much useful instruction on the general arrangement of gardens and the views are almost invariably sound. The greater portion of the book is taken up with a description of species, beginning with those which are natives of China and Japan. These are by no means dry botanical details, but an effort to give descriptions of these plants that will indicate their value for ornamental coloring, although every paragraph shows careful study of their habits and observations which are of genuine scientific value.

Mr. Mitford thinks that these plants are destined to become much more largely used in extra-tropical gardens than they have ever been. He calls attention to the fact that the famous gardeners laughed at him when he began to plant his newly imported and starveling canes, but unexpected success has attended his efforts at acclimatization,

and he thinks that there are many other species than those we now grow which can be made to beautify our gardens. There are Bamboos growing high up on the Himalayas which are only known by herbarium specimens, and one species, at least, in the Andes grows at an altitude equal to that of the summit of Mont Blanc, and he thinks there are many others waiting to be discovered on mountain heights where ice and snow are at home. He notes the fact that all the Bamboos that have proved hardy in England have the veins of their leaves checkered or tessellated, and by something of a coincidence the hardiest of the Palms also have tessellated leaf-veins. He thinks, therefore, that whenever a Bamboo is found at a great altitude, at least high enough to be surrounded by non-tropical vegetation, a leaf structure of this kind will be almost a guarantee of its hardiness.

A delightful chapter is one entitled *Apologia pro Bambusis meis*, which is a justification for his passion and a plea for his reeds. He objects to that affectation of severe taste which would banish everything from English pleasure-grounds but English shrubs and herbs, and yet he plainly belongs to those who see in the teachings of the architectural school of gardening a menace to what he considers the more beautiful and effective way of planting. Many readers will sympathize with his criticism of the "acres of paving-stones surrounded by balustrades, and bespattered by jets of greater or less size, which were dear to the French architects." Perhaps we cannot better conclude this review than by adding some other quotations.

In these heavy masses of masonry there is only dignity for those who admire that which is costly. The poetry of gardening lies in another direction. Who can conceive a Dryad making her home in an Orange-tree incased in a green wooden tub? What nymph who respects herself would bathe her dainty limbs among the glorified squirts of Sydenham? Another test: Could a painter paint these formal gardens of ashlar? Could a poet find inspiration in them? Would Saint Bernard say of them what he said of the woodland: "Aliquid amplius invenias in sylvis quam in libris"?

He who would lay out for himself a paradise—I use the word in old Parkinson's sense—cannot do better than to set out to drink in wisdom in Japan. Not in the Japanese gardens, for nowhere is the gardener's work more out of tune with Nature than in that country of paradoxes; but on the mountain-side, in the dim recesses of the forest, by the banks of many a torrent, there the great silent Teacher has mapped out for our instruction plans and devices which are the living refutation of the heresies of stonemasonry. There are spots among the Hakoné Mountains of which the study of a lifetime could hardly exhaust the lessons. The sombre gloom of the Cryptomerias, the stiff and stately Firs, Pine-trees twisted and gnarled into every conceivable shape, flowering trees and shrubs in countless varieties, combined with the feathering grace of the Bamboo, and all arranged as if the function of each plant were not only itself to look its very best, but also to enhance and set off the beauty of its neighbors, present a series of pictures difficult to realize.

The Japanese are true lovers of scenery; no people have a keener feeling for a beautiful landscape; to them a moon rising over Mount Fuji is a poem, and their pilgrimages to see the Almonds in blossoms, or the glories of the autumn tints, are almost proverbial, and yet, strange to say, in their gardens they seem to take a delight in setting at defiance every one of those canons which Nature has laid down so unmistakably for those who will be at the pains to read them. The Japanese garden is a mere toy that might be the appanage of a doll's house. Attached to some of what were the Daimios' palaces in the old days there were some fine pleasure-grounds, well laid out, rich in trees and daintily kept. The gardens of the Mikado, by the shore of the bay of Yedo, are beautiful. But the average Japanese garden is such as I have described it—a mere whimsical toy, the relic of an art imported from China, and stereotyped on the willow-pattern plate. . . .

The truth is that in every good garden there is a poetical or spiritual beauty with which these crude and flaunting artifices (topiary work, grottoes, carpet-bedding and the like) are out of tune; the air which breathed o'er Eden still in some mystic sense pervades our groves. "God planted the first garden"; and if man was formed in His image, may we not believe that certain more favored spots still reflect the idea of that first Divine Garden? To catch the spirit of these is the supreme

art of the gardener, and leads him to the realization of the next proposition of the text, "the purest of human pleasures."

I look upon gardening as one of the fine arts, and, rightly understood, not one of the least difficult. The painter or the sculptor makes his effects at once, and obliterates, or models and remodels, until he has attained that at which he is aiming. But the gardener has to consider, not what his work is now, but what it will grow into ten, twenty, fifty years hence. He has to take into account, not the present aspect of his materials, but what are their capabilities in the future and their relative powers of development. If he has a background ready made to his hand he is lucky, but if he has to make it he has to do so with trees which are mostly far slower of growth than the more immediately effective plants which it is their office to set off. He has to balance questions of soil, light, moisture. All this involves not only the poetic sense, but also great and patiently acquired knowledge. He has no Alladin's lamp wherewith to bid trees spring from the earth and form a sheltering background, yet background is the soul of all gardening, rarely, alas! seen at its best by him who has devised it. If the background be unfitting all the work is thrown away. Color, form, light and shade, grouping, all have to be studied in the composition of one of those living pictures which the gardener paints with living materials.

Notes.

An examination of trained and experienced gardeners for positions in the New York Park Department will be held on Friday, June 12th, by the New York City Civil Service Boards. Application blanks may be had at the office of the Board in the new Criminal Court Building.

The people of New York city have again shown their appreciation of open spaces in the general protest against the plan to build a public bath-house in Tompkins Square, and a detached section of the recently condemned blocks at Division, Suffolk and Hester Streets has been set aside for the building which would have destroyed the park-like character of Tompkins Square.

From September 1st, 1894, to August 31st, 1895, Sicily sent to the various ports of the United States 2,047,000 boxes of lemons. From September 1st, 1895, to May 31st, 1896, the receipts were 2,057,000 boxes, or 10,000 boxes more for nine months than for the entire previous year. During the same nine months 678,000 boxes and 156,000 cases of Mediterranean oranges were imported, probably 200,000 boxes less for this year than for the twelve months ending August 31st, 1895.

The New York Florists' Club and New York Gardeners' Society announce a flower show, to be held at the Newsboys' Home, on Duane Street, this city, June 20th. The exhibits will practically be contributions, since they will be distributed among some 20,000 children after the show. Many commercial growers have arranged to exhibit bedding plants, bulbs and seeds, and persons who do not care to enter into competition are invited to send plants and cut flowers for distribution. Schedules of classes of exhibits and other information may be obtained from James I. Donlan, Secretary Exhibition Committee, 51 West Twenty-eighth Street, New York city. The express companies have generously agreed to carry the exhibits and contributions free of charge.

At the recent meeting of the New Jersey Forestry Association, Mr. Fernow called attention to the fact that this state was once well wooded everywhere. If at that time the virgin timber on such soils as were not fit to be made into farming-land had been cut with care and systematically, and the fires kept out, it would produce now and continue to produce forever an income of not less than \$5,000,000 to \$10,000,000 annually, giving employment to a large number of people. Now, through the mismanagement of former years, the 2,500,000 acres of land unfit for anything but wood crops do not yield \$1,000,000 of values, or less than one-tenth of what they would yield under management. Few persons realize what the wood crops mean in the economy of a nation.

Hemerocallis flava, or, as sometimes called, the yellow Day Lily, is still opening its pure colored flowers, and when seen near a group of white Pæonies, or among the gray-blue and purple varieties of the German Irises, no combination can be more beautiful. This is an old plant, but one of the most useful in the herbaceous border. All it wants is room, food and sunshine to make a magnificent display. The individual lily-like flowers last but a single day, but the buds will open in water, so that a single stalk will last a long time. A large vase filled with a mass of these long-stemmed flowers makes a really

imposing display. Almost as good in color and form, and flowering a month or so later, is *H. Thunbergii*, which is less common, but quite as desirable. There are several other species in cultivation of varying merit, but all are good.

From fifty to a hundred car-loads of strawberries are shipped every day from Hammonton, New Jersey, and as raspberries and blackberries come into market the output will be still greater. It was formerly the practice of the berry-farmers in southern New Jersey to send their fruit to commission men individually, but under that system berries often came into Philadelphia, the nearest market, when it was practically full, so that whole car-loads were often dumped into the Delaware River because there was no demand for them. In later years, however, a coöperative union has been formed here as well as in many of the other districts where small fruits and orchard fruits are grown, and all the product goes through this organization. These unions keep in communication with all the markets of the country, and they are prepared to ship the fruit where it is in most demand, so that hundreds of crates are sent from New Jersey as far west as Chicago, and, indeed, the largest profits are often realized from these long shipments. Philadelphia is so largely supplied by berry-fields close at hand that shipments to New York, and even to Boston, from Hammonton are large in comparison with those to the nearest important city.

Peas from Long Island sell for thirty-five cents a half-peck. Asparagus, from New Jersey and other near-by points, costs twenty to thirty cents a bunch, and cauliflower from the same sections fifteen to twenty-five cents a head. New beets, carrots and turnips from this state may be had for five cents a bunch. Squashes from South Carolina cost ten cents each, and cucumbers from the same state are plentiful and command but thirty-five cents a dozen. String beans from Virginia sell for thirty-five cents a half-peck, and sweet potatoes or yams, from Florida, at the same rate, the Vineland supply being, of course, exhausted. Celery, from Florida, is succeeding the northern and western crops, and costs twenty cents a single stalk. Okra at ten cents a dozen, and eggplants at twenty-five cents each, come from Louisiana, and tomatoes from Florida and Mississippi. The latter cost fifteen cents a pound, the hot-house product selling for double that price. The best Bermuda potatoes bring thirty-five cents a half-peck, and onions from the same islands cost ten cents a quart. The largest cargo of Bermuda onions received this season arrived last week, when the steamer *Trinidad* discharged 40,000 crates, and 32,000 crates were due by the steamer *Muriel* on Monday of this week.

Nine car-loads of California fruits were sold in this city last week, mostly cherries. The variety *Royal Ann*, known also as *Napoleon Bigarreau*, brought the highest prices, and other well-known sorts were the white-fleshed *Cleveland Bigarreau*, sweet and of rich flavor; the handsome amber-colored *Rockport Bigarreau*, with red markings; *Centennial*, beautifully marbled and splashed with crimson on a pale yellow ground; the favorite dark cherry, *Black Tartarian*; the somewhat later *Black Republican*, the excellent English variety, *Black Eagle*, and *May Duke*, *Queen Victoria*, *Purity* and *Governor Wood*. Apricots of good size and coloring now in our markets are the French variety *Royal*, perhaps the most popular apricot in California. The large, slightly oval fruit has a dull yellow skin and orange cheek tinged with red. The stone is free, and the firm juicy flesh has a vinous flavor. The *Newcastle*, more brilliant in color, is also seen, and the small *Pringle*, valuable mainly for its extreme earliness. *Alexander* peaches are coming from California, large and attractive, and *Clyman* plums, mottled reddish purple, with beautiful blue bloom. During last week 119,700 bunches of bananas were sold at the wholesale auctions in this city. Blackberries, huckleberries, cherries, peaches, plums, apricots, muskmelons and watermelons make an attractive display on the fruit-stands. The showiest strawberries seen here in several years are immense specimens of the variety *Mary*, from Essex County, New Jersey, and a new seedling from Virginia. The former is of a deep rich color, fairly regular in size, the largest measuring six inches around at the stem-end. Twenty of the fruits fill a quart box, and these sold on Monday at thirty cents. The seedling from Virginia was equally large, perhaps less even in form, lighter and more brilliant in color and less firm. Great American is another beautiful berry now in season, large, remarkably even and regular in form and a rich color. These berries sold for twenty cents a quart. Peaches are now coming from Georgia and Florida, the latter state sending the best which have ever come from that region. These sell at \$1.00 for a box containing twenty-five fruits.

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An Architectural Garden.

THE location of the house of Mr. E. C. Benedict, on the Indian Harbor property, is certainly one of the finest on Long Island Sound. The old Indian Harbor Hotel (once known as the Americus Club, of Tammany fame) was built on this point some years ago, and was still standing when the present work was begun. This beautiful point of land, almost entirely surrounded by water (on the west side by a landlocked harbor), and rising as it projects toward the water, so that the point on which the house is situated is the highest point of the site, is exceptional. It is covered with beautiful wild woods in a good state of preservation (see plan on page 243).

The site of the old hotel was adopted for the present house because of its height and proximity to the water, its beautiful outlook, and also because this portion of the land, being very rocky, is less wooded and needed architectural treatment. The materials used in the main construction of the building are either stone or brick, covered with a stucco composed of cement and marble dust. The roofs, where apparent, are covered with red Italian tiles, while the architecture and landscape work are somewhat Italian in character.

At the entrance, a stone lodge, somewhat picturesque in its treatment, and stone walls across the point, with wrought-iron gates, are built among the Oak-trees in such a way as to harmonize with the natural beauty of the spot. After passing the lodge, a drive of about an eighth of a mile through absolutely wild woods leads gradually to the architectural features of the house and its surroundings, a few flowering bushes in groups being the first indication of cultivation. At the point where the different roads to the stable, service house, docks, etc., meet, a semicircular stone bench and wall are built, beyond which avenues of symmetrically planted trees lead through the natural woods to a formal entrance with stone walls and grilles. Beyond the grille, a broad and formal avenue, with six rows of trees symmetrically planted, leads through a formal landscape to the inclined drive or ramp, and to the flight of stone steps, both of which lead directly to the porte cochère. The house is at the apex of the property and also of the general composition.

The formal landscape is thus treated as a gradual transition or introduction between the perfectly natural woods and the absolutely formal portion of the composition—the house and terraces immediately surrounding it, with ramps and staircases, etc. This principle of general treatment in landscape prevails in all the fine works of Europe and other parts of the world. In Versailles, for instance, the Château on the town side is treated with an entirely formal paved court, a theatre forming one wing of the court, a chapel the other, an elaborate entrance, grilles and walls enclosing it on the fourth side. The other façade of the Château faces beautiful parks, terraces and fountains, the axis of the Château being an extended vista, so that the eye glances first over entirely formal surroundings, and gradually, through a less formal garden, until it reaches the natural landscape beyond.

This effect has been sought on the land side of Mr. Benedict's house, though, of course, in a very much less ambitious and extensive way, owing to the limitations of the site. On the water side, the terraces, with overhanging balconies and balustrades and stone walls, have been treated so as to follow the outlines of the rocks and to lead gradually from the architectural to the natural, the immediate surroundings of the house being formal terraces and terrace gardens. When approaching the house, whether from the land side or from the water side, the transition from the natural to the artificial is gradual, and in itself natural, the whole landscape forming a beautiful foreground or frame for the crowning feature—the architecture. When looked at from the house the treatment forms a foreground, leading gradually to the natural, and at the same time framing the landscape.

The treatment, in detail, comprises the main house, which is L-shaped, the hollow of the L being south and east, which gives not only the most beautiful outlook, but also the best exposure for sunlight and cool breezes. The treatment of the gardens within the terraces is formal, with hedges, flowering plants, gravel paths, balustrades, steps and vases with Palms and Bay-trees. The trellis-work, or pergola, is somewhat similar to the celebrated one at Amalfi, an illustration of which is given on p. 245. It is to be covered with large-leaved vines, and to lead from the main house to the smaller house, which is built for the use of members of the family.

From the main house a flight of steps leads to the dock, which is placed at an angle to suit the channel, permitting the landing of passengers from a large yacht directly at the dock. On the upper landing a semicircular seat, surrounded by columns and covered with a trellis of vines, forms a half-way resting-place. A pavilion which overhangs the rocks overlooks the tennis-court on the land side.

The boat-house, in the hollow, is the dining-room of the old hotel, moved down and altered for the purpose. The terraces and walls along the trellis and the east and south sides of the house are the old foundation walls of the Indian Harbor Hotel, restored and altered as to details and crowned with balustrades and other features. A picturesque path leads from the stone seat at the entrance, along the water edge and along the trellis-work, down over the rocks, all around the property, following the water's edge. Between the stable and the mainland about five acres of land have been made by building bulkheads and dredging the landlocked harbor, so as to permit of its use for the anchoring of yachts. These five acres of made land will eventually be used, in part for vegetable and flower gardens, and in part for grazing lands; a small farm is located in the woods north of the made land. East of the stable, on the bulkhead that has been constructed to reclaim the land, a large coal and ice house, engine house and repair shops have been provided, as well as a dock which will permit a large yacht to be laid alongside it during the winter in a perfectly landlocked harbor.

In carrying out the details of the scheme much blasting for cellars and other features was required, furnishing practically all of the stone needed, not only for the foundation

of the buildings, but for sea walls, roads and much of the filling, so that in altering the profiles of the land little or no extra material was required beyond soil and dirt filling for the top surface. Where masses of large trees were needed holes were blasted in the rock, which is naturally full of fissures, and were filled with soil, in which the trees have been planted.

In this design it has been the endeavor of the architects to make an interesting ensemble of buildings and grounds in a ground plan studied from the artistic point of view. The forms are irregular, and as unbalanced as the letter L, yet with symmetry and circulation such as they hope will give interesting vistas in every direction. A good plan of house and grounds, as seen on paper, aside from the questions of arrangement, has proportion, form, scale, color, values and character. The drawing of such a plan will awaken as much enthusiasm in the educated architect as does the picture in the painter or the statue in the sculptor. This plan should be thoroughly studied and practically finished before the architect has more than a vague idea of the design of the exterior of the building. The plan involves and determines the entire composition; the silhouette or outline of the whole is really projected on the plane of this drawing. If the relations to each other of roads, paths, buildings and other features are well studied and look well on paper, they are almost sure to prove successful when seen in perspective after the work is completed. Such a comprehensive plan does away with the necessity of perspective drawing as a help to architectural as well as landscape study, and leaves it no place except to explain a building to a layman. The many elevations of the several buildings on Mr. Benedict's place have been evolved from the general scheme, and are the natural expression of the whole plan. No one elevation of the houses would give any idea of the entire scheme, as the greatest interest centres in the general composition of the grounds and relations of the buildings to each other, or what the French call "the plan général." They have a very characteristic name for this portion of the composition, which is the "sauce of the architecture." It is this portion of the design which unites or marries the building with its natural surroundings. Most of the same principles of composition obtain in the planning of this portion of the work, as in the planning of the buildings themselves. The silhouette must make first of all an agreeable ensemble with the silhouette of the buildings.

While the landscape or surroundings should govern the general composition of the building in the beginning, the building should in turn, when completed, influence and govern the arrangement and composition of that portion of the landscape work which comes in immediate contact with it. This landscape work is to surround and support the building, serving both as frame and as pedestal. The accessories of the architecture, such as the terraces, balustrades, paths, fountains, open spaces and vistas which come nearest to the building, and other architectural features, are really a part of the building. While the plan of the surroundings does not need to repeat the form of the building itself, it should everywhere recall its principal axis and lines, and it should accentuate its general silhouette, just as where there is a pavilion or important feature in the building there should be a circulation in the surroundings leading up to it. Fountains, balustrades, statues, and rows of trees, when desired, should be clearly indicated in plan. All these things, with the plan of the building itself, should hold together in one ensemble, while there may be interesting details in the form of niches in the verdure for statues, or recesses for seats, or vases, and small round or square breaks taken off the angles where two paths meet. All these forms should be studied almost exactly in the same way as if they were in the plan of the building itself.

The day is coming when the public and honest critics will demand of design in architecture and landscape something more than mere taste and refinement of details—

something more than a house planted in the landscape without design, or roads winding in meaningless curves through scattered trees, without unity—and this can be only when the plan is looked upon as something more than merely a question of convenient arrangement, and the picturesque as something more than an eccentric accumulation of accidentals and good details.

New York.

Thomas Hastings.

Pinus muricata.

THE characteristic Pine of the Mendocino coast region is *Pinus muricata*, which here fills the place which farther south is occupied by the kindred Monterey Pine, *P. insignis*. A hardy adaptable tree it is, making the best of all conditions, and only asking to be near its beloved sea. Hanging to the sides of the steep ocean bluffs, where the spray dashes, its growth is all on one side and horizontal. Standing on the bold headlands in groves, the wind-scarred veterans on the outside bend from the wind and protect the inner ranks, while within the sheltered park-like areas the favored trees develop into symmetrical and beautiful dark-leaved specimens. Standing alone on some wind-swept point, tall, gnarled and picturesque, the growth one-sided, with only a single living limb perhaps, and this one reaching out horizontally for a long distance and terminating with a dense tuft of green leaves, while the dead limbs are decorated with the cones of years, the tree is always in keeping with its rugged surroundings.

At Fort Bragg, *Pinus muricata* covers the sandy plains with a dense wood of straight slender trunks, the weaker dying out and leaving finally open deeply shaded groves carpeted with leaves, and the trees fifty or sixty feet high. All the oceanward slopes of this high rocky coast were once, with few exceptions, covered with forests of this Pine, but it has had to give way to green fields and gardens. It makes good lumber, but the supply far exceeds the demand, and each year sees large areas of pine woods chopped down, and in the fall fire sweeps through the tangled mass of limbs, vines and underbrush, and makes way for the plow.

Back from the coast a mile or two, where once the Redwood held sway, this Pine appears as a hardy colonist; rising from a heavy thicket of bushes of half a dozen sorts, and a network of logs and fallen trees, it disputes the mastery of the upper air with lusty sprouts of Redwood, vigorous descendants of the original occupants, with Fir and Hemlock. In the rich soil of these woods it reaches its best estate, and trees of fine proportions and seventy feet high are not uncommon.

Still farther from the coast in the barrens a hard battle has been waged for ages without material gains to either side. The struggle is for the possession of a poor thin soil, and colony after colony of *Pinus muricata*, *P. contorta* and *Cupressus Goveniana* have occupied the disputed territory for eight or ten years, only to be swept away by the resistless fires. A few groves where underbrush is thinner have managed to hold their own for ages; a few live to form groves of handsome trees perhaps twenty years of age, but more only reach the height of six or eight feet. A little farther back, where the barrens cease and the Redwood forest begins, the last Pine is seen at a distance of less than five miles from the ocean.

The cones of *Pinus muricata* are very persistent and the seeds are retained in them for many years. The coast is a region of summer fogs, and the sun is seldom hot enough to open the cones, and it oftener happens that they are never opened until a fire furnishes the needed heat, and in sweeping away one wood seeds the soil for another.

The wood is valueless for lumber. If left on the ground it will in a few years fall to pieces of its own weight. As an ornamental tree it should rank high. It is easily transplanted, the foliage is a fine dark green and dense, and it has a good, round-headed form.

Ukiah, Calif.

Carl Purdy.



Foreign Correspondence.

Notes from the Temple Show.

THE chief event of the week has been the great annual exhibition of the Royal Horticultural Society held in the historic gardens of the Temple, within the boundaries of the City of London. Here in these Temple gardens, four centuries ago, grew the famous white and red Roses, the badges of the rival houses of York and Lancaster, where now there is only friendly rivalry among rosarians in displaying the perfect charms of the descendants of these historic Roses.

The gardens are an ideal spot for a large show, but much too small for such a prodigious gathering as this, and, besides, there is no opportunity of making a really effective display with splendid material such as one sees in Paris and Belgium, where the arrangement of exhibits is considered of primary importance. The most brilliant groups of plants become monotonous and insipid if arranged in a flat way unrelieved by foliage, and the true way to arrange a show is to combine as much as possible the color and the greenery in pleasing harmony. This cannot be done well unless the exhibition surface is diversified, as in the permanent show-ground in the Regents Park, where at various places there are raised points from which visitors can obtain a survey of the whole display. This exhibition clearly showed the gradual change that is coming over flower-shows in this country compared with those of a few years ago. Huge pot-plants, laboriously trained and formal in the extreme, have almost disappeared, and their places are taken by more easily grown plants and groups of a miscellaneous description. Prominence is now given to the popular classes of plants, and particularly to Roses, Carnations and hardy perennial flowers, and where a few years ago ten kinds of hardy flowers were shown there are a hundred now. Plantmen of the old school lament this change, but there is no doubt that popularizing easily grown and beautiful plants has done permanent good to horticulture. There was, however, in this huge exhibition a conspicuous dearth of real novelty both in new plants and flowers and in arrangement.

Among the Orchids, which, perhaps, occupied more space than any other class, were several remarkable novelties, particularly of forms of *Cattleyas* and *Lælias*.

The certificated varieties were *Cattleya Mossiæ*, *C. Beatrice*, *C. Arnoldiana* and *Charles Ingram*, all of exquisite beauty, but not easily described, as they resembled each other, differing only by mottle tints. The two forms of *Lælia purpurata* named *Arthur Wigan* and *Lewis* were extremely fine, the latter having pure white sepals, with lilac-mauve lip. Of *C. speciosissima* there was a splendid variety named *Ernesti*, the flowers much above ordinary size, of a lilac-mauve, with lip spotted and blotched with crimson. Messrs. Linden, of Brussels, showed what was the cynosure of the Orchids. This was an exceptionally large-flowered form of *Odontoglossum crispum*, named *angustrum*, with the petals heavily blotched with chocolate-red. Messrs. Low showed another similar form, *Lowiæ*, and still another named *Miss V. Ellis*, also with heavily spotted flowers, thirteen on a spike. These were the chief novelties among the collections, but the varieties were numerous.

New Cannas were plentiful, though only one received an award. This was *Madame Pichon*, of French origin of course, a plant of good dwarf habit. Flowers large, rich yellow, heavily spotted with vermilion. Of the newer sorts shown the best were *Progression*, *Königen Charlotte*, *L. E. Bailey*, *Edward Meig*, *Paul Marquant*, and a finer half-dozen could not be selected.

Carnations were in true form and numerous, though, of course, all from under glass. Several varieties were considered worthy of certificates. Two *Malmaisons*, named *Lord Rosebery*, deep crimson, very large, and *Lady Grimston*, creamy white, striped with rose, were the best of a large collection. Of Tree Carnations, the best of the new

sorts were *Cardinal Wolsey*, dark apricot, striped with crimson; *Mrs. Hambro*, a beautiful pure white; *Mephisto*, dark crimson; *Loveliness*, pale pink. These new sorts are real acquisitions.

Roses formed probably the greatest attraction of the show, for, considering the early date, they were splendidly grown, huge specimens trained in a globular way so as to travel without injury. Our Rose growers seem now to have become more successful with early Roses than formerly. Perhaps they have taken hints from American growers, but certain it is that we get forced Tea Roses in March, April and May that are superior to those grown in the open in July. The now widely known *Crimson Rambler* was shown, forced into bloom, as it will not be in flower outside for a week or more. It is a very showy Rose, though it does not last long in bloom. A new Rose, quite as fine for the garden and much earlier, is *Paul's Carmine Pillar Rose*, a single-flowered variety, of the color of the old *General Jacqueminot*.

The pot Roses that seemed particularly fine for forcing were *Caroline Testout*, *Mrs. J. Laing*, *Duke of York*, *Ulrich Brunner* and *Madame de Watteville*. There was one new Rose certificated, named *Grand Duke A. de Luxembourg*, from Messrs. W. Paul—a fine globular flower, pale pink, flushed outside with a deeper tint.

Foliage plants included a few good novelties, and some of these were certificated. Of Palms there were *Phoenix Roebelinii*, a small-growing Date Palm, with slender recurving leaves, and a fine decorative plant. *Calamus ciliaris*, an old Palm shown by Messrs. Sander to illustrate how fine it is in a small seedling state for table decoration, a purpose to which it is put throughout India. It is a capital Palm for decorative florists, as it is easily raised from seeds and the old plants can thus be replaced. Among the new Ferns, *Adiantum lineatum*, from Monsieur Linden, is likely to prove a useful addition to decorative kinds. It is a dwarf, compact grower, the deep green fronds streaked with silvery pencilings. It reminds one of *A. macrophyllum* in size and form of fronds. *Pteris Boultonii*, a form of the variable *P. serrulata*, is also fine for room decoration. *Davallia Truffautiana* is an exceptionally distinct species with a tendency to form a stem. It has gracefully arching fronds and is very handsome.

Caladiums were among the brightest features in the show, and, although easily grown, they obtained a great deal of admiration from those who appreciate finely grown plants. Among several new kinds certificated were *Silver Cloud*, silvery white and flushed with pink; *Duchess of Connaught*, green and carmine veinings; *Sir Julian Goldsmid*, white ground, crimson veins; *Duchess of Teck*, greenish white and pale rose—four first-rate sorts.

Trees and shrubs are rarely shown well at these exhibitions, the chief among them being *Rhododendrons* and *Azaleas*, though there were no conspicuous novelties among these beyond a good variety of *Azalea* named *Diamond*, from Messrs. Veitch. This is distinct from any other sort I know. It has rather small flowers, but an abundance of them, of a soft pink, with crimson blotches. It looks like a cross between *A. mollis* and a Ghent variety. *A. Monsieur Desbois* was the finest new *Mollis* variety shown, but it does not eclipse the new *Antony Koster* for brilliancy of yellow and profusion of flower. A variegated form of *Hypericum Moserianum* named *tricolor* was certificated. It is a pretty-leaved sort, but it is doubtful if it will keep its color in the open air. *Buddleia Colvillei* is a beautiful species, well shown by Mr. Gumbleton from his warm garden at Cork. It is a beautiful shrub with long graceful panicles of rose-pink flowers. It is, unfortunately, too tender for open-air culture about London, but is quite worthy of greenhouse culture. It is from the Himalayas.

Among all the hardy flowers there were but two that were conspicuously new. One was *Trollius Caucasicus*, *Orange Globe*, a first-rate variety, eclipsing all others in size of flower and habit of growth; its flowers are two inches across, of a bright orange-yellow, like those of *T. Japonicus*.

The other novelty was the double form of the Welsh Poppy, with flowers about the size and form of the double-flowered *Kerria Japonica* and of a rich orange-yellow, originated with and shown by Messrs. Backhouse, of York. After it has been got out of its nursery stage it will prove a first-rate showy hardy flower.

Kew.

William Goldring.

Plant Notes.

SPANISH IRISES.—The great masses of hybrid German Irises which have lately filled the garden with color are now missed, but an easy consolation may be found in the Spanish Irises, which so closely succeed them. There are a brilliancy and a clearness of color about these bulbous

IRIS LORTETI.—This has been the latest of the *Oncocyclus* section in flower this season. This Palestine Iris is by some considered the most beautiful flower of the family, and is certainly charming, both in form and coloring. It may be briefly, if crudely, described as a pink *I. Susiana*, though there are said to be forms with violet markings. As it is now flowering with Mr. Gerard, the flowers resemble good forms of *I. Susiana*, both in size and form. The large standards are white, with many pink lines. The falls are dotted with pink and have a deep rose signal. The styles are tinted a shining golden brown. This species, though recently introduced, is now obtainable at a moderate price and should be grown by all fanciers of choice plants. If the rhizomes are kept in dry soil until late in the autumn



Fig. 35.—Pergola at Amalfi, Italy.—See page 241.

Irises which have always made them favorites. In fact, they are so well known by gardeners that it would seem superfluous to say anything about them were it not for the fact that even the most common flowers seem to be unknown to many gardens. Briefly, it may be said that these Irises have narrow claws and standards and possess a wide range of coloring in whites, yellows, blues, browns and their combinations. The bulbs, which are inexpensive, should be ordered with the Dutch bulbs, preferably in named kinds. They are perfectly hardy and need no protection in this latitude. They show foliage above ground during the winter when the season is at all open. The special care required is to keep them moist while growing, as otherwise they are likely not to flower.

and planted out after the ground becomes cold there should be no care required in their cultivation beyond keeping the soil moist during the growing season, which soon ends. It is better to plant them in the open garden rather than in a sheltered place, where the supply of moisture early in the year may prove insufficient.

ROSA WATSONII.—The leaflets of this Rose are either three or five on each leaf, long and narrow, none of them being much more than two lines in breadth. The most peculiar feature of the plant is the coloring of the leaf. The ground color is greenish yellow, the veins being marked with deep green, forming hieroglyphic-looking characters along the margins, and these markings are more pronounced when the plant is grown indoors. It

forms a neat little bush and seems to be entirely hardy. The flowers are exceedingly small, but little more than half an inch across when fully expanded. The color is white or pinkish white.

CAMPANULA PERSICIFOLIA GRANDIFLORA.—The Peach-leaved Bellflowers have been favorites in gardens for many decades, especially the white forms. Mr. Backhouse has recently introduced a specially fine form with extra-large flowers of perfect purity of color. The plants are hardy perennials. They are readily increased and bloom profusely at this season. This is one of the most attractive recent introductions in hardy plants, and its neatness of habit is by no means universal among hardy perennials.

Cultural Department.

Flower Garden Notes.

RECENT copious rains have been of great benefit to the flower garden, and all bedding-plants as well as hardy perennials are now growing luxuriantly. Seldom, at this season of the year, have lawns looked more fresh and flowering plants been more thrifty. Tender plants are now becoming well established, and the beds will require hoeing after heavy rains to loosen the surface. Dead trusses should be removed from Geraniums, and Coleus, Alternanthera, Stevia, Achyranthus and other foliage plants be pinched once a week. During dry weather we give our beds a thorough soaking once in four days with a sprinkler, and continue this until the plants have grown sufficiently to cover most of the space allotted to them. Tuberous Begonias flourish in a moist shady location; they can scarcely be overwatered, and a mulching of fine rotten manure is beneficial. Any bedding-plants left over should be planted out, given away or thrown on the rubbish-pile. On many places a few plants are seen dotted here and there in the houses or frames, a useless claim on space and labor.

Perennial borders are at their best during the month of June. *Paeonies*, *Papaver orientale*, *Aquilegias*, *Iris Hispanica* and *I. Germanica*, *Pyrethrums*, some of the *Campanulas*, the double-flowered *Lychnis viscaria*, *Heuchera sanguinea*, *Anthericum*, *Hemerocallis*, *Dictamnus* and *Thalictrums* are now at their best. Biennials, including Canterbury Bells, Sweet Williams and Rockets, are a mass of bloom. *Antirrhinums*, wintered in a cold frame and planted out in April, are just commencing to flower, and continue to do so most of the summer; they are among the most beautiful and useful plants for the mixed border. Seeds sown in March yield nice flowering plants by July and August. A good many of the later-growing perennials will now require staking; if left unsupported too long the plants are liable to break or the stems to be twisted, when it is difficult to tie them up neatly. *Delphiniums* which are now flowering should be securely staked, as winds and heavy rains break them down badly. Weeds grow rapidly during weather such as we are now having, and many of them will have to be removed by hand.

Early Stocks are now in flower. A later batch has just been planted out, and we usually sow the last lot about the end of June, and this provides a succession of flowers until October. We make several sowings of *Asters* during the season, using Dwarf Chrysanthemum, Dwarf Victoria and the Pomponne varieties for the last sowing at the end of June. The earliest lot of Queen of the Earlies and Comet, which commence to flower about the middle of July, are now growing strongly. Liquid-manure is applied when they commence to branch out. Sweet Peas sown out-of-doors commenced to flower here the first week in June. The trenches they are sown in are three or four inches below the level of the ground, so that the plants may be more thoroughly soaked with water during dry weather; we have recently mulched about the rows with spent mushroom-manure, to keep the roots cool and moist. Hybrid Perpetual Roses have commenced to bloom fully a week earlier than usual, and will be at their best by the middle of June. They have made extra growth this season, and have so far not been attacked by rose-bugs or any other pest. We give our beds a dressing of green cow-manure early in May and the sprinkler is allowed to run on the beds during dry weather. Only by adopting such means can we obtain really satisfactory blooms. Although the past winter was severe on flowering shrubs and killed back *Deutzias*, *Weigelas* and some of the *Spiræas*, *Roses* came through safely. The new Crimson Rambler proved to be one of the hardiest, standing out almost unprotected and being killed back but little. Our last planting of *Gladioli* is not made until the first week of July. We thus

have a succession of bloom from July until October. Those planted last do not furnish as fine spikes nor mature as good bulbs as the earlier ones, but *Gladioli* are so cheap and increase so rapidly that this need be no drawback to late planting. We find *Gladioli* specially useful for decorative purposes in September and October, when many other flowers have a rather disheveled appearance.

Carnations grown for summer flowering will soon require staking to keep the flowers clean. Some of our plants are already in bloom. The stock being grown for winter flowering needs looking over once a week to insure necessary stopping. The plants are growing unusually well this season, the showery weather having suited them to a nicety. We use the hoe or hand cultivator to free the soil after every rainfall. Violets which were not planted out this year until toward the end of May, owing to rainless weather, are now commencing to grow nicely. A mulching of pulverized rotted manure will be given these a little later. The hoe and cultivator must be in frequent use at this season. Weeds and insect pests can only be kept under by unceasing care and watchfulness. Weeds exhaust nourishment from the soil needed by other plants and are an eyesore. There are few places where thorough cleanliness is observed, in some cases owing to lack of assistants to do the work, or to the employment of men whose knowledge of gardening is slight, but who work cheaply. But more frequently those in charge are at fault in not planning their work properly.

Taunton, Mass.

W. N. Craig.

Choice Perennials.

VERBASCUM OLYMPICUM is the finest of all the Mulleins, and as it is perfectly hardy in this locality it ought to be grown in every garden where there is a choice collection of perennial plants. The plants grown here were raised from seed two years ago and are flowering now for the first time, and only the strongest plants have blossomed. This fine Mullein is easily raised from seed, and the seedlings make large strong plants the first year, with vigorous long leaves. In spring the leaves of the previous year are replaced by new ones; they are distinct and conspicuous and of a whitish color. The leaves are revolute, broad lanceolate, acuminate and woolly, measuring from twelve to eighteen inches. The flowers are bright yellow and measure more than one inch in diameter. The stout, erect flower-stems are from four to five feet high and are branched from near the base like a candelabrum. The plant is exceedingly showy and can be seen from a considerable distance. It is grown in the border here in an open position and in deep rich soil. I think it would make a good rock-garden plant where large plants are needed in a high open position. It is a native of the Levant and was introduced from there in 1883.

Another Mullein which I received last fall from Rae Brothers, Norwood, Massachusetts, under the name of *Verbascum pannosum*, is now in flower. Before the plants blossom they can hardly be told from those of *V. Olympicum*, but as the two species are in flower at the same time they are easily compared. The Olympian Mullein is by far the showier plant; nevertheless, *V. pannosum* is a distinct plant and makes a good perennial. The sulphur-yellow flowers measure over an inch in diameter and are produced in a stout, dense, erect spike.

A little more than a year ago I received seed of *Pentstemon glaucus*, variety *stenosepalus*, and raised several dozen plants. They were grown in the nursery-bed all last summer and planted in their permanent places in the fall. It has proved to be one of the most satisfactory *Pentstemons* we grow. Every plant I set out in the fall lived through the winter and all are blossoming freely now. Any species or variety in this genus that proves hardy and grows satisfactorily is valuable, as so many *Pentstemons* are not reliable in this climate. This plant grows about fifteen inches high and its leaves are slightly glaucous. The radical leaves are subovate and the cauline ones ovate-lanceolate. The violet-purple flowers are produced in compact panicles and the flower-trusses last for several weeks. *P. glaucus* is found in the mountains of Colorado and Utah.

The Oriental Poppies, *Papaver orientale*, have made a gorgeous display for the past two weeks, and many buds have to open yet. My experience with seedlings of this handsome Poppy is that they do not make much of a show until they are three or four years old, because the plants are too small and not able to produce enough blossoms to prolong the display for more than a few days. The plants we depend on for our display of this showy perennial measure more than a yard across and produce a large number of blossoms. Although the individual blossoms are short-lived, one good feature is

that they do not all open at one time. From the time the first blossoms open until the last ones expand is about two weeks, and sometimes longer.

Many species of the genus *Allium* are not desirable garden plants, but at this time two showy species are blossoming. *A. Moly* is a European plant with large showy yellow flowers, produced in compact umbels. This bulbous plant is ten to twelve inches high and it is well suited for planting along the front row of the herbaceous border. Another showy species is *A. Ostrowskeanum*, which has large showy umbels of purplish flowers. Both of the above *Alliums* are perfectly hardy, and can be obtained in autumn from the bulb dealers. If planted then they will blossom about the end of May or early in June.

Gentiana acaulis is a beautiful little alpine, which has blossomed better here this year than for several past years. There is no plant in the garden, when it is in blossom, that has such pure blue flowers. The flowers are very large, compared with the size of the plant, campanulate in shape, and measure two inches in length. The plants are grown here in a slightly shaded moist spot among pieces of limestone and are protected slightly in winter.

Aster alpinus grows very nicely in our rock garden, where its blue heads of flowers are produced plentifully. It is a dwarf plant from six to eight inches high, and its flower-heads measure two inches across.

Harvard Botanic Garden.

R. Cameron.

Orchid Notes.

THROUGH the exertions of collectors it is possible to have Orchids in flower abundantly throughout the entire year, and the succession is unbroken in a good representative collection. The durability of the flowers, both on the plants and when cut, makes them especially useful for decorative purposes. The flowers of some species are fugacious, but generally this peculiarity is, if not the result, at least the characteristic that accompanies a powerful odor. The kinds with no perceptible fragrance sometimes last for months in perfect condition.

One of the most useful species at this time is *Miltonia vexillaria*. It is a temperate-house plant, or one that requires a temperature that does not vary much during the whole year. Hence we grow it in winter in what would be termed a warm house, and in summer the plants are placed in the coolest place possible. While there is considerable variation of temperature between midwinter and midsummer, we have no plants that thrive better or give more satisfaction. Last season we had a plant, one bulb of which produced forty-one flowers, and we learned that this Orchid will sometimes attempt more than it can continue indefinitely, and that the flowers should be thinned so as not to tax the energies of the plant. *M. vexillaria* comes from a region characterized by daily rainfalls throughout the year. Even in the dry season there are mists and showers. While distributed over a wide range of latitude, from northern Colombia to Ecuador, its altitude is well defined and uniform wherever it occurs, mostly on the western slopes of the Cordilleras. It there has the benefit of the precipitation of moisture-laden winds from the Pacific. This moisture is an important item in the cultivation of the plants, for without it they will speedily be disfigured by thrips. Tobacco stems strewn about the pots will keep this pest away, and they are capital absorbents of moisture as well. After flowering, the plants take a short time to recuperate, and then start to grow in early autumn, when they should be repotted. They should be repotted each year, for owing to the great amount of water they require the compost would be injurious to the plants if allowed to remain more than one year. The growing period lasts throughout the winter, and care must be taken that no checks occur from want of water or insects, or their flowering will be affected unfavorably.

Each year at flowering time *Cattleya Gaskelliana* proves its superiority. I know of no other *Cattleya* which makes as fine specimens in so short a time; it does not deteriorate as do some other species. Plants that were purchased less than four years ago in six-inch pots are now in twelve and fourteen inch pans. The leading growths double in number each year, and if care is taken all will flower freely. The fact that some *Cattleyas* fail to flower at times may often be traced to excessive vigor and insufficient rest or maturing. If *C. Gaskelliana* for any reason fails to bloom, it is sure to start into a second growth, which must be encouraged liberally until finished. Our climate is apt to induce plants to make this second start, and English cultivators keep their plants dry to check the tendency. This would be ruinous here, as it would weaken the plants. If the plants are encouraged they will usually be well matured by winter, and will then flower well in summer. Our

plants failed to bloom well at first, and we were told to put them out-of-doors after the flowering season was past. The coolest and most airy house was chosen instead, and the next and each succeeding year has proved the need of plenty of air for Orchids during the summer months. If *C. gigas* and *C. Gaskelliana* flower well this year it will take them so long to become strong and plump that they will not start into growth again before winter. It is an old idea that the greatest factor in making a tree fruitful is to have it bear a crop of fruit. Fruiting checks excessive vigor and immature ripening, and this is true of Orchids as of other plants.

The best time to pot *Cattleyas* is before they begin to make new roots or when they are making them. There are two well-marked divisions of the genus, from the cultivator's point of view—those that flower directly after growth is completed, as *C. labiata*, *C. gigas*, *C. Gaskelliana* and others; and those that rest for a time before flowering, as *C. Trianae*, *C. Mendelli* and *C. Percivalliana*. The last-named we report directly after the flowers are cut, as the plants start to root at once. But with the other division the system is changed, for if we waited to repot until after flowering, many roots would be active and badly injured in the operation. So they are repotted as soon as signs of growth are observed. With *C. labiata* this often occurs in December. *C. Gaskelliana* is repotted in January, when the other kinds are also ready, so that all *Cattleyas* are potted during the winter months, when time can be best given for it to be properly done. Nothing but the best fibre from the roots of *Osmunda cinnamomea* is used. This material takes years to decompose if used alone, but if moss is added it speedily becomes sour and inert, and when the roots touch it they perish.

Many cultivators are taking up the most interesting work of hybridizing and raising seedlings. It is a fascinating experiment when success attends the work, and not without some profit if conducted on proper lines. There is still ample room for original research for all engaged in the work. It is simple enough until it comes to germinating the seeds. We find the best medium for this purpose is fern-fibre, as already stated, taking care to keep it in a condition bordering on saturation. If the minute barleycorn-like seeds become dry after sowing they will not change to the pleasing little green, pegtop-like, thaloid bodies that denote the first distinct stage of germination. These bodies are even more susceptible to drought than the seeds. I have heard of a successful operator in this work who never sowed seeds on the soil of a valuable plant, and the reason is obvious, for the great amount of moisture necessary to bring about successful germination is enough to injure the plant.

South Lancaster, Mass.

E. O. Orpel.

Trevesia palmata.—This plant is also called *Trevesia Sundaca*, and more commonly *Gastonia palmata*. The leaves are very large, attaining a diameter of two and a half feet. The leaf divisions, instead of being widest at the base, are narrower there than nearer the apex, being contracted at the part where the division takes place, and this gives the leaves a very odd appearance. On an old plant growing in the bed of a cool greenhouse at Washington there are growths twelve feet long, and all their length is clothed with its princely foliage. It is a native of India. *T. eminens* is also well worth growing. The leaf divisions are more numerous and not quite so broad as in *T. palmata*, and they do not have the peculiar formation in the leaf divisions of that species. Good-sized specimens can be grown in pots, and they are valuable for veranda decoration in summer or for house decoration in winter. Cuttings from one to two feet long can be rooted in sand if the atmosphere surrounding them is kept moist and at a temperature of at least sixty-five degrees. Stems denuded of the foliage will sprout if treated in the same way as *Dracaena canes*.

Chinese Dianthus.—I have better success in the cultivation of Chinese Pinks in treating them as annuals than as biennials. My plan is to sow them quite early, say, in the middle of February, and when the seedlings are large enough prick them off, three in a three-inch pot. After a week or two the plants are removed to a frame where they get abundance of air to harden them off and develop a stubby growth. When planted out in well-prepared soil they start growing immediately. By the middle of May numbers of them are in full bloom, and with attention in the way of watering and cultivating during summer they flower constantly and make a display that few annuals surpass. Seeds of the different varieties can be secured in separate packages. Planted near each other they hybridize so easily that the flowers of plants raised from seed the second year show marked variations in color. A batch of plants raised this year from German seed are especially fine. Plants kept over the winter start off well in the spring, but in

a short time they become straggling and flower irregularly, and the flowering season of the two-year-old plants is shorter than that of fresh plants. Our soil is a stiff clay, and they undoubtedly relish being planted in freshly prepared soil. This year I tried a mulch of rotted manure about the old plants, but it did little good. Most of the kinds set seed freely.

Botanic Garden, Washington, D. C.

G. W. O.

Correspondence.

Notes from Santa Barbara.

To the Editor of GARDEN AND FOREST:

Sir,—Every visitor to Santa Barbara notices the great number of fine specimens of Araucarias, chiefly *A. excelsa*. The city is becoming famous for these trees, which are well adapted to the climate. Some of these superb trees are a hundred feet in height, and give a very distinguished appearance to the principal streets. Comparatively speaking, the lack of fine Californian species of conifers is quite as striking as the presence of fine exotic species. The coarse and stiff Monterey Cypress, which is more admirable in its native grove at Cypress Point than anywhere else, is far too common in the public squares. There seems to have been a period, about twenty years ago, when many towns in California planted formal, orchard-like blocks of cheap trees, and called them parks, often surrounding them with close-clipped hedges of Cypress. In several such cases I remember that the Monterey Cypress was the only tree planted on a five-acre square; in others the Blue Gum, *Eucalyptus globulus*, was selected by the Town Council. Santa Barbara's public squares are not so bad as this, but they are distinctly below the high standards set by the taste and skill displayed in its private gardens and nurseries.

Santa Barbara has had the good fortune to possess many citizens of wealth, leisure and love for plants, so that its private collections contain specimens hardly found elsewhere in the United States, as visitors can see by referring to any good handbook of the city or to Dr. Franceschi's interesting pamphlet on the exotic flora of the region, which includes the suburbs of Goleta and Montecito.

Among the choice specimen plants which the visiting botanist would wish to see are the fine *Seaforthia elegans* on the grounds of Mr. Eddy, and the large *Cocos plumosa* in the Stevens garden at Montecito. There are also the splendid *Damara Pines* in Mr. Sawyer's garden. I also noted several large *Casuarinas*, *C. quadrivalis*, particularly one at Goleta, and some choice specimens of *Ficus macrophylla* and *F. elastica*. At Carpentaria one finds the Ford collection, which includes a great variety of rare deciduous trees. There are weeks of pleasure and profit to the botanist in looking up the fine specimen trees of this district, and probably one could find many not yet catalogued. Nor is there any place in southern California where the ordinary commercial nurseries contain a wider range of plant-life, nor so much that is difficult to find elsewhere.

The grounds of the old Mission are well worth a visit. Ladies are seldom admitted into the enclosed court-yard, but gentlemen, upon request, are usually shown through. The healthfulness of many of the plants within this sheltered square is surprising, and I saw here the finest *Araucaria excelsa* of its size that I remember to have found anywhere. The court has been photographed more than once, but its quaint, old-fashioned beds, its ivied walls, its windless quiet and perfect peace all need to be seen to be appreciated. In the old Mission orchard are a few seedling Pear-trees, planted a century ago, and still bearing fruit. The ancient Olives are not doing well; only three or four can long survive. The gentle German priest who showed me around explained that several varieties "were very good, indeed; better than any we can buy." Others were only fit to cook. Eight or ten distinct types of Pears were in the orchard. The best will be grafted at some of the experiment stations, so as to keep alive these old Spanish pioneer varieties.

Niles, Calif.

Charles H. Shinn.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—The Crimson Rambler is among the latest Roses to blossom in our garden, and a small specimen set out last year is just opening its flower-buds. Planted in a wild part of the garden in ordinary soil and left untended it has made satisfactory growth, and is a pleasing addition to the Wilderness, as we call the rock-brake over which it scrambles. *Rosa Wichuraiana* is even later in blossoming, but is now in bud.

Frequent heavy rains have marred the beauty of the Roses and beaten down the heavy-headed *Pæonies*, which are near the end of their flowering, though a few Chinese *Pæonies* are still in bloom. But few shrubs are in flower now. *Weigelia*s and some *Deutzia*s are past their prime. The Golden Elder and the common Wild Elder are showy now, the former coming into blossom a week earlier. The flowers of *Opulaster opulifolia aurea* have faded, and are succeeded by interesting clusters of dull red carpels, which are no less attractive and contrast well with the golden-yellow of its foliage. Oak-leaved *Hydrangeas* will soon be in flower, and these symmetrical, well-rounded shrubs, with their large handsome foliage and bold balls of flowers, are showy for several months. A group of small shrubs composed of *Itea Virginica* and *Ceanothus Americanus*, or New Jersey Tea, is now in flower. These plants are visited by rose-bugs, but the pests are less numerous than usual, perhaps owing to the frequent rains.

The borders are gay with Sweet Williams, Snapdragons, Petunias and Linarias. A beautiful white *Pentstemon* forms a large clump in the rock-garden, and has been blooming for some time. Groups of *Astilbe Japonica* are attractive now, flowering more profusely than usual. These *Astilbes* seem to need much moisture, as they do well only in wet seasons at Rose Brake. Rockets, or Dame's Violets, are still in bloom, and Hollyhocks and Yuccas are opening their flowers. Madonna Lilies, planted in a large group where they have been undisturbed for years, have thrown up numerous flower-stalks, and every stalk has many buds. They form a fine group against the background of *Deutzias*, and are now the most conspicuous feature of the lawn.

Shepherdstown, W. Va.

Danske Dandridge.

Azaleas at Brookline.

To the Editor of GARDEN AND FOREST:

Sir,—From the middle of May until the middle of June there is a grand show of Indian Azaleas under canvas on the grounds of Professor Sargent, Brookline, Massachusetts. As soon as the first plants begin to go out of bloom, others, retarded in deep shaded pits, take their place, so that the exhibit is always fresh-looking. It is, without doubt, the finest collection in the country. From a limited number of privileged visitors a few years ago thousands of persons now enjoy this remarkable collection annually. The plants have been exhibited in superb condition for several years past, and this uniform success is attributed to the system of cultivation practiced here. As the treatment accorded the plants immediately after the flowering season has much to do with success or failure, it may not be out of place to review the methods of cultivation at this time.

As soon as the plants return from the exhibition tent they are trimmed of all dead flowers, weak shoots, and otherwise pruned into shape. They are then turned out of the pots, all loose soil shaken off, and the original ball of earth combed over with a rake used for this purpose. This is done every season, and the plants do not form any considerable quantity of roots during the winter, which is, in fact, their resting season. The system of potting in the autumn places the plants in better shape for convenient handling during the remainder of the season. This treatment is too radical for most gardeners, and few, even in the immediate vicinity, can be persuaded to follow it. With success by continuous pot culture they are satisfied to continue old methods. After a thorough dressing-over the plants are transferred to a specially prepared piece of ground, in which at least one-third of good leaf soil and a little sand has been well composted. The soil is carefully compacted about the plant, so that the new soil and the old ball of earth are a solid mass. It is essential that the density should be uniform and kept so, and the plants are repeatedly examined during the summer to see that the soil is kept firm about the ball. If the soil is loose water will run over it and pass into the ground around the ball, so that while the surface may appear moist for a time, it is, in fact, dry an inch or two below. To see that the plants are never dry is the important part of their summer cultivation.

Where all are beautiful it is scarcely necessary to describe the many varieties in detail, and there are many seedlings as handsome as the best named varieties. There is a fine old plant of the flesh-tinted *verschaffelti*; other distinct sorts are Countess de Chambord, blush white; E. Mazel, vermilion; Decora, reddish pink; Iveryana, a perfect sheet of tinted white; Bride, white; Criterion, blush; Exquisite, pink. Worthy of special note are several large plants of the handsome climber, *Trachelospermum jasminoides*, trained on pyramidal wire shapes. These are stood in prominent positions about the entrance porches.

Wellesley, Mass.

T. D. Hatfield.

Notes from Southern California.

To the Editor of GARDEN AND FOREST:

Sir,—The beautiful "Mariposa Lilies" seem more delightful and satisfying each year. In a former letter I mentioned *Calochortus Catalinæ* as being in bloom. Following this came *C. luteus* and its varieties. I have recently seen a bed of these in cultivation here; the flowers were larger and more abundant than on plants in a wild state, and suggested choice yellow garden Tulips on a branched stalk. Some of the blooms when opened flat measured four inches across. They were of a rich yellow color, with yellow hairs and brown markings in the centre. One particular plant bore flowers of an old-gold shade. The plants were from fifteen to twenty-four inches high and sent out scattering branches from the ground upward, with one to two flowers open at a time on each branch. If this family of bulbous plants could be successfully grown in the eastern states it would certainly be a great gain there.

Romneya Coulteri is now in bloom in my garden. The first flowers are generally the largest of the season. I have just measured one which is six and three-fourths inches across; its snow-white petals are beautifully crisped throughout their entire surface. The stalks are seven feet high and of this season's growth.

Inga pulcherrima was often found in mixed collections of greenhouse plants in the Atlantic states twenty years ago. Eight years ago I planted it in my garden here, and it is now a fine specimen some seven feet high. During April it made a gorgeous show, being clothed from top to bottom with its brilliant scarlet flowers, in form resembling an upright tassel of silken threads. It also flowers somewhat sparingly during the summer and autumn.

Los Angeles, Calif.

E. D. Sturtevant.

Recent Publications.

The White Pine: a Study, with Tables of Volume and Yield. By Gifford Pinchot and Henry S. Graves. New York: The Century Co., 1896.

We welcome the appearance of this little book as a sign that, beyond the general interest of laymen in forestry matters, there is supposed to exist now sufficient interest in the technical side of forestry to warrant such entirely technical discussion as the one before us. The lumber business has relied hitherto, and, no doubt, will continue for some time to rely, upon the crudest exploitation or cutting over of the virgin woodlands, without any idea of devoting time or money or thought to their treatment as continuous crop producers. As long as virgin supplies exist that may readily be made accessible, the incentive to a change of this method will be small. We believe, however, that with the exhaustion of the bulk of the White Pine—the great staple of our lumber market—which is threatened in the near future, an awakening to the needs and the possibilities of forest production as a business may be looked for, when information of this nature will be sought after more eagerly; and the booklet may serve to stimulate inquiry in that direction.

Hitherto efforts to gather such knowledge have been confined to official agencies, and it is, therefore, a further ground for gratification that private interest could be induced to furnish the funds for such an investigation. Although the little duodecimo contains not more than 102 pages, widely printed and margined, the construction of the tables it contains represents an amount of labor which no one who has not had to do with similar work can fully realize. We cannot, however, admit that this is the "first systematic description of the growth of a North American tree" in view of the published reports by the New York, New Hampshire and Maine Forest Commissions, which treat more or less exhaustively of the growth of the Spruce, albeit in a different manner and in some respects less, yet in other respects much more satisfactorily. Nevertheless, this is a commendable effort of two young American foresters to apply their knowledge of European forestry methods to the study of one of our most important timber trees. And even if nothing more is gained than to make clear the point of view from which the questions of technical forest management and forest finance must be approached and

the manner of obtaining the basis for it, the authors and publishers will have done good service to the cause of forestry.

In silvicultural direction the contents are rather scanty, the main importance evidently having been laid on the question of the rate of growth and yield of the White Pine. This is a complicated and difficult problem in the evenly grown European forests under management, much more so in the very uneven conditions of our virgin woods, and much more so than the authors have realized. Although they repeatedly acknowledge the limitations of their opportunities and defects of their methods, they have failed to fully appreciate the extent to which these defects influence their results. They have, indeed, failed to realize the extremely varying character of tree-growth, which makes such wholesale averaging as they have employed entirely unreliable, except with a very large number of data. Hence they are oversanguine when "they confidently believe that they (the results) will be found reliable, not only for the region where they were obtained, but also for other portions of the habitat of the White Pine." In this expectation they will certainly be disappointed, fortunately for the prospects of profitable forestry and of our best crop producer, the White Pine, as we will be able to demonstrate when the much more extensive measurements from many localities collected by the Division of Forestry are published, which will show their results regarding rate of growth twenty-five and even fifty per cent. out of the way.

The data, therefore, may, at best, only be used as approximation to conditions in the region of Pennsylvania, where they were gathered, and for this purpose it would have been desirable if more of the detail of the measurements had been given, from which the reader or the practitioner could have made his own deductions, avoiding the many suppositions which have figured in the construction of the tables, and which, in the absence of the possibility of verification, to some extent shake confidence in their value. In several directions it is impossible to make out exactly what their method has been; it would appear, for instance, that while 160 trees were analyzed, no use was made of these analyses in constructing the curves of rate of growth; these seem to be based on what is called the average tree of the group, which in our uneven stands is a most unreliable basis for standard values.

It would lead us too far to point out in detail the flaws in the procedure, especially as this would require explanations of a technical nature, which our space does not permit at this time. Suffice it to say in general that, while the methods employed may be adequate enough for rapid approximate determination of the contents of a given area, they certainly are not admissible for the establishment of standard tables. The construction of yield tables of normal growth can, indeed, not be done by simply dividing the contents of an imperfect stand by its density, for the trees in a normal stand develop entirely differently, and hence are not, either in the number or diameters, height or volume, proportionate to those of an imperfect stand. The authors owe us, and would find it difficult to furnish, proof, that for any practical or financial purposes, such as the book claims to have been written for, "this method is sufficiently correct."

Nevertheless, while these flaws render the work of less directly applicable value, and do not, as the authors suppose, settle in the main the absolute amounts of the rates of growth and production, the tables illustrate very well the nature of the problem and give an idea of the relative values. They also contain much of interest to the forester and lumberman. The latter will especially welcome those tables which exhibit the percentages of merchantable timber at various ages, the length of lumber, the proportion of sapwood and the contents of standing trees of different diameters.

We are glad that the era of technical forestry literature under private editorship seems to be fairly started by this publication, and hope that our criticisms will only serve to

increase the interest in the same and lead to further efforts in similar directions.

Forestry Division, Washington, D. C.

B. E. Fernow.

Notes.

On St. Mary's, one of the Scilly islands, whose flower-farms furnish the supplies for the London market, it is reported that 900,000 Narcissus bulbs alone were planted this year. St. Mary's is but nine miles in circumference.

A correspondent of the London *Garden* speaks of the beauty of a mass of *Rhododendron Vaseyi* which was flowering in the Azalea garden at Kew. When it is remembered that this plant was discovered only ten years ago the record that it has already made on both continents as a good shrub is quite remarkable. There is reason to hope that by hybridizing it with other species a new race of early-flowering Azaleas will be established.

A preliminary meeting of citizens of New York interested in tree-planting in the residence portions of the city was held May 22d, and it was proposed to regularly organize the association and elect officers on Thursday, June 25th, at 3.30 P. M., in the rooms of the Wool Club. Mayor Strong has consented to the use of his name for President, and many well-known citizens have signified their intention to become members. The annual dues of the society will not exceed \$5.00, and the receipts will be used to publish pamphlets and in disseminating information to the public on the best methods of planting shade-trees on streets, the best sorts for this purpose, etc. Application for membership may be made to Cornelius B. Mitchell, 64 and 66 White Street, this city.

Peppers, eggplants and muskmelons, grown under glass by students in the Department of Horticulture, Cornell University, were on sale in New York last Saturday, along with the same vegetables grown in the open in southern states. The peppers were extra-large, firm and crisp, and brought seventy-five cents a dozen, those from Florida and Louisiana realizing twenty-five to fifty cents. The melons, while small, were of good substance and excellent flavor, and commanded forty to fifty cents, those from the south bringing fifteen to thirty-five cents each. Owing to the continuous supply of southern eggplants during the winter and spring, their abundance during the past fortnight, and the consequent lack of novelty, the eggplants found almost no demand; those from Florida cost ten to twenty cents each.

Seven hundred and seventy-five members have already enrolled themselves in the Audubon Society established a few weeks ago in Boston and already commended in these columns. The object of the society is to preserve our native birds by discouraging the use of their feathers in personal decoration. Among the vice-presidents of the society are the senior Senator of Massachusetts, the President of the Massachusetts Historical Society, the President of the Massachusetts Society for Promoting Agriculture, and many other well-known citizens and a number of women distinguished for their artistic and social attainments. Any one can become a member of the society by agreeing not to purchase or wear the feathers of wild birds and paying \$1.00. The Secretary, to whom all communications should be addressed, is Miss Harriet E. Richards, Boston Society of Natural History, Boston. There are no annual dues.

At the meeting of the General Federation of Women's Clubs recently held in Louisville, Kentucky, the following resolution was adopted: Resolved, that whereas there is nothing of more paramount importance to the welfare of state and nation than the preservation and economic development of our national resources, and whereas it is everywhere apparent that the wicked and wasteful destruction of our forest cover is a direct robbery of these resources and should be checked by every measure both of private endeavor and of legislative enactment, and whereas it is self-evident that if these threatening conditions are realized and public sentiment aroused an incalculable benefit would be conferred on our entire nation, be it resolved that, as federations of women's clubs and as individual clubs, as far as possible we pledge ourselves to take up the study of forest conditions and resources and to further the highest interests of our several states in these respects. This measure, presented by members whose intelligent interest and energy have already definitely furthered forestry work in several states, was ordered printed and circulated among the 1,500 clubs in the Federation in the United States, and it is proposed to follow up this beginning with pamphlets and lectures.

The market for string-beans last week is said to have been the poorest of any in the experience of produce dealers in this city. The enormous quantity of nearly 65,000 packages was received, many of which were barrels. The remarkably low price of thirty to fifty cents a barrel prevailed on Monday, and with stock coming in faster than it could be disposed of from North and South Carolina, Virginia, Maryland and New Jersey, any offer sufficient to cover the cost of freight was accepted later in the week. Twenty to twenty-five cents became the rate for Norfolk shipments, and those from North and South Carolina, less fresh, owing to the longer journey, brought but ten to fifteen cents a barrel, not enough to make good the cost of transportation. Many thousands of barrels were placed in cold storage, but the experiment is hardly likely to prove profitable, as on the first indication of better prices fresh stock will be hurried in from Maryland and New Jersey fields. There is also a surplus of cabbages, cucumbers, tomatoes and other vegetables. This condition is caused by the prolonged drought in the south and consequent delay in the maturing of crops, so that the southern produce is now coming in at the same time with vegetables from near-by states. On last Friday 15,000 bushels of cucumbers reached this city, and these sold for forty to seventy-five cents a bushel. On the same day 7,000 bushels of tomatoes were received, which realized but seventy-five cents a bushel at wholesale.

Red currants, from Maryland, on Saturday sold for fifteen cents a pound, and raspberries, also the first of the season, brought ten cents for a pint of the black fruit and fifteen cents for a cup holding a third of a quart of the more delicate red berries. Huckleberries, from North Carolina, have been quite plentiful, and so have blackberries from the same state and from Maryland and Delaware, costing eighteen cents a quart. Strawberries from Maryland and Delaware are becoming scarce, and some of the best varieties from New Jersey, like the Gandys, have passed out of season. The dry weather in April and early May caused short crops in this state, and most of the berries are small. Some fancy strawberries from Hilton and Irvington-on-the-Hudson were in special demand last Saturday. They were extremely large, of rich color and lustre, and with choice specimens of the variety known as Mary, from Essex County, New Jersey, brought sixty-five to seventy-five cents a quart. Prices ranged from fifteen to twenty cents for small, ordinary fruit, twenty-five to thirty cents being an average price for good fruit. Supplies have been coming from western New York in small lots until last Saturday, when the refrigerator-car service began, insuring a fair supply for this week. Watermelons, from Georgia, are already plentiful and cheap enough to be common on fruit-stands and in greengrocery stores in the poorer sections of the city, and the largest selected melons can be bought for forty to fifty cents. Thirty car-loads arrived here during last week.

We have spoken before of the damage the extreme cold weather in western New York last winter did to fruits. A correspondent of *The Agriculturist*, writing from Genesee County, where there are tens of thousands of trees of the Duchess Pear, says that most of the older dwarf trees escaped with little injury, though many were killed. They flowered, but the bloom was sickly and the pears failed to set. The foliage is now withering and adventitious buds have started out on the large limbs and trunks until they are in some cases almost covered with leaves. Within a year or two past many of these old Duchess trees have been grafted with Clairgeau, which is less liable to disease, but probably seventy-five per cent. of the grafted trees are killed to within two or three inches of the ground. Trees of Bartlett, Howell, Anjou and Seckel show healthy foliage, but are carrying no crop. They have proved their ability, at least, to endure cold that kills the Duchess and Clairgeau. From a half to two-thirds of the Peach-trees of all varieties are dead. Green Gage and German Prunes show a few blossoms, the other varieties not one, while on Coe's Golden Drop, Bavay, and even the old Damson, much of the wood is killed. Half of the trees of the sweet varieties of Cherries are already dead. The old sour Morello bloomed and a small crop set. Among the Grapes, the inferior Clinton is unhurt. Worden, Cottage and Martha are very little injured, while Duchess, Prentiss, Jefferson and Victoria seem dead to the root. A vine of the Lindley, which seems to have been one of the writer's favorites, was destroyed, with the exception of one branch which lay on a roof and was covered with snow. This is now making new wood. Altogether, this shows that fruit which will endure climates where the mercury often falls to ten, and occasionally to fifteen degrees below zero, cannot endure such a degree of cold as thirty degrees below.

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Hitch your Wagon to a Star.

COLONEL WARING may not have remembered this counsel of Emerson when he set out to clean the streets of New York; but he certainly began with a lofty aim, and of this the city was reminded in a striking way a few days since when his well-disciplined force of men and horses marched down Fifth Avenue under the eyes of applauding thousands and were ceremoniously reviewed by the Mayor. It was a remarkable spectacle when one imagined how impossible the mere idea of a "Street-cleaners' Parade" would have seemed two short years ago, and what one would have seen had the men and the carts and the horses of that time filed by in procession. It was an inspiring sight when it was recalled through what a storm of distrust and abuse Colonel Waring had to make his way when he proposed to turn politics out of his department, and especially when he put his men into uniforms—and white uniforms at that. The banner bearing the prosaic legend, "Four Hundred and Twenty Miles of Streets Cleaned Every Day," had an air of poetry to all who realized that those miles had really been cleaned, and beyond this one accomplished fact there stretched before the imagination unbounded possibilities of municipal improvement and refinement along a hundred hitherto untrodden paths.

Our streets are not yet as clean as streets should be; but the fault does not rest with the chief or with the men in white uniforms. It lies partly with our rough and ill-kept pavements, and partly with the untidy habits of our people. Therefore the astonishment with which our people beheld the manly-looking men, the well-bred, dignified officers, the neat, brightly painted carts and the well-groomed horses, which now are thought none too good for the humblest kind of municipal service, drove home a doubly significant lesson. Our people were taught respect for municipal work of every kind—for every sort of civic service; and let us hope, at least, they were taught that they should try to help the actual servants of the city in the prosecution of their tasks. Especially hopeful, from this point of view, was the presence in the parade of the school children, girls as well as boys, who have banded themselves together to keep watch over the cleanliness of our

streets. For, it hardly needs saying that it is easier to train up children to be moral, in public as in private ways, than to reform the immorality of adults.

Colonel Waring aimed high when he insisted upon securing the best workmen to be had, put responsible educated men in control of them, and supplied his department with the best tools of every sort. Therefore the clean white uniforms on parade were not grotesque, but made an impressive and an instructive sight. The lessons thus taught do not hold good for New York alone, or for great cities alone. The spirit shown by the head of the Street-cleaning Department here should animate every city official all over the land, every town officer and every selectman or village ruler under whatever name. The intensely practical American people possess a deep vein of idealism. They are too busy to give much heed to its murmurs, but once a strong enough appeal is made, they respond with surprising alacrity. Our dump-cart has been hitched to a star, and so we are growing proud of our street-cleaners and more sensitive in regard to other municipal matters. Already the laborer has learned that a city's uniform is not a badge of slavery or inferiority, but, like a nation's uniform, a sign of respectability and honorable office. Looking at these white uniforms, the people understand that even a street-sweeper can be pleasant to behold, and that no servant of the public should be allowed to present himself before the public untidy. With the children to help us, we shall soon blush for our ill-kept pavements, shall grow ashamed to litter our streets with papers, shall take better care of our doorsteps and yards.

What a huge and hurried and overpopulated and necessarily dirt-amassing city like New York can do, and what its overbusy people can learn, surely may be done and learned in those country towns and little villages where the conditions are infinitely more favorable and the people are far less severely taxed in body and in mind. It is much easier to hitch the car of cleanliness, orderliness and beauty to a star in the country than in the town. Efforts to reach the highest ideal should be earnest and unrelaxing, but they are not worthy of the name if they are prosecuted in a hurry, or superficially. The aim should be the loftiest, but if workers are few and resources small, the field may well be limited. It is better to make one street as orderly and beautiful as possible than to putter about a dozen streets in an irregular, futile way. It is better to put a single little park or square into perfect condition than to make a couple of new paths and set out a few new trees and shrubs in every open space in the town. It is better to choose a single fine young tree of an appropriate sort, to plant it in the very best way, and to tend it carefully, than to choose a hundred carelessly, plant them cheaply and give them scant attention. It is better to cultivate a single Rose-bush lovingly than to fill a whole border with Rose-bushes and then neglect and starve them.

If the good taste of our people and their habits as to cleanliness and order are to be judged by the quality and care of their public buildings, public streets and public grounds we certainly need a good deal of education in this direction. The great proportion of our municipal and state buildings have little artistic value, their walls are scribbled over by idlers, and they are generally defaced, dirty and ill-kept. Few people ever think that it is a mark of untidiness to throw paper and other litter into the public streets. Indeed, most people toss rubbish of all sorts into the highways as if they were built as a receptacle for refuse. Unless watched by policemen, visitors in public parks too often break off armfuls of flowers and shrubs, walk on the grass borders where paths are provided, and never think that as part-owners of the place they ought to do as much to protect and beautify it as they would to their own private grounds. The object-lesson of clean streets here and the league of children to save them from becoming a dumping-ground for all that is unclean marks an era in our municipal history. It is not too much to expect that with such examples here and the work of village-improvement

societies all over the country the time will come when any one who willfully defaces a public building or litters up a public place will be looked upon as a criminal. Most surely, any one who does not respect the rights of society stands in the attitude of a public enemy. Society certainly has the right to demand that its highways and public grounds shall be kept clean and wholesome. One who is willfully guilty of the unspeakable nuisance which may fill the air with microbes of consumption and other diseases as surely deserves punishment as one who willfully pollutes the city water-supply.

Forms of Some European Conifers.—I.

THE Spruce, *Picea excelsa*, appears on the Swiss Alps in several remarkable forms which are not, strictly speaking, varieties, but peculiarities of development of the trunk or of the branches. I do not know if American dendrologists have observed analogous modifications in the Spruces which inhabit North America, but this subject would certainly be worth investigating.

As is well known, the normal form of the European Spruce has branches obliquely ascending or horizontal, with spreading branchlets. Among the trees of this type may be found, especially on steep declivities, a pendulous form with pendent branches and long, slightly branched, very slender branchlets descending vertically and giving to the tree the aspect of a Weeping Willow.

In another form, the pyramidal, the branches ascend at narrow angles, giving to the tree the habit of the fastigiate Cypress or of the Lombardy Poplar. Another special form is the strigosa, with very numerous slender horizontal branches furnished with numerous branchlets spreading from all sides of the branch. This form resembles the Larch in habit, often in a most remarkable manner.

A form which is rare in the Alps, but common in the north of Norway and Finland, near the northern limits of the range of the species, is columnaris. In this form the tree is small and feeble, with short tufted branches which form a narrow column. The Swedish botanists consider that this diminutive form is due to the effects of the early and severe cold of the winter which checks the growth of the branches. I only know this form in our Alps by a note and figure in the *Journal Suisse d'Economie Forestière* (1896, Number 4), but in this instance it is only the upper part of the tree which assumes the columnar form, while the lower part presents the ordinary aspect. Individual Spruce and Fir trees (*Abies pectinata*) often occur on the Alps of columnar habit, but these are usually large trees whose branches have been shortened by the attacks of insects.

Another form of the Spruce produced by exterior influence is the Nana, which is always striking from its regular pyramidal habit with short, slender, tufted branches, which have the appearance of having been trimmed by one of Louis the XIV.'s gardeners. Such trees are rarely more than six feet high, and their dwarf habit is due simply to the browsing of goats or of chamois, which in winter are frequently driven to food of this sort.

The inhabitants of the Alps distinguish by special names (Géants, Epicéas Protecteurs, Epicéas de Tempête, etc.) the individual trees which, near the upper limit of the forest, often stand alone in open pastures, where they frequently grow to an enormous size and from time immemorial have sheltered cattle and their guards from tempests.

The form *furcata*, with a trunk divided usually five or six feet above the surface of the ground into two or three stems, is not rare; but the most curious form is that which I shall call *stolonifera*. I have seen it only once in a park near Geneva, where there is a group of large trees growing on a gentle slope, with their long lower branches on the ground. At a considerable distance from the trunk these branches have rooted and produced saplings which have already grown to considerable size, one branch even repeating this phenomenon a second time at a considera-

ble distance from the first point of rooting. This remarkable development, which resembles the growth of a Strawberry-plant from a stolon, has not been produced artificially, but is entirely natural, and the trees which are already old afford one of the most curious spectacles imaginable.

Bâle, Switzerland.

H. Christ.

Plant Names of Indian Origin.—I.

IN a manuscript dictionary of North American plant names, of which I began the compilation many years ago at the suggestion of Dr. Gray, and which has reached voluminous proportions, there are many strange words, some of foreign and others of American origin, the meaning of which is not generally known. Many of these words have found their way into recent dictionaries, some unaccompanied with any explanation, while the etymology assigned to others is entirely erroneous. Among the unexplained native plant names there figure in considerable number words of aboriginal origin, which are invariably marked in dictionaries as "North American Indian," a very vague statement in view of the fact that within the limits of the United States alone there are represented fifty-eight distinct stocks or families of Indian languages that differ as radically from each other as they do from the Aryan or Semitic families. Of these linguistic stocks, the Algonkin, which occupied a much more extensive area than any other, has given us the majority of the plant names that are really of aboriginal origin (for all that are thus specified in dictionaries are not Indian). Next in point of numbers come names derived from the Aztec through Spanish; then those borrowed from the Carib dialects of the Greater and Lesser Antilles; then a few from South American Indian languages; and, finally, one or two each from the Timucuan, Muskogean, Siouan, Salishan, Chinookan, Shahaptian, Shoshonean and Wakashan families of the southern and western states.

To *The Sun* (New York) of June 30th, 1895, I contributed an article on the words that have been introduced into English from the Indian languages of North America. These words were divided into three categories: (1) Animal Names, (2) Plant Names, and (3) Miscellaneous Words. Of most of the words of the first and third classes I gave translations, but of the plant names I offered merely a bare list, with the intention of elaborating this part of the subject at some time in the future and in some journal where the matter would meet the eye of those who are familiar with plants and their popular names, and to whom the subject is of more interest than it is to the general public.

I present the list, thus amplified, herewith, premising that a study of this kind is attended with considerable difficulty. Were there but a single family of Indian languages, the interpretation of any given word, unless it were a derivative from an archaic root of lost or uncertain meaning, would, after a study of the different dialects, be comparatively easy. But such being far from the case, and our Indian-English plant names having been borrowed from different linguistic sources, it becomes necessary in the first place to find out as nearly as possible where they originated (not always an easy matter), and then to ascertain the language now or formerly spoken in the locality; otherwise one might be led into gross error, for there are, perhaps, few Indian linguistic families that do not contain in their vocabulary words similar in sound (and in form when written) to words in another and entirely distinct language. Thus, to give but a single example, Wahoo is a Dakota (Siouan) name for a certain tree, another Wahoo is a Muscogee (Muskogean) name for a tree also, while still another word, Wahoo, is the Micmac (Algonkin) name for an egg.

Having traced the word to the place of its origin and to the language to which it belongs, we may find, as in fact we sometimes do, that the language is extinct and has left behind it but meagre traces of its vocabulary, or that it has not as yet been sufficiently studied, radically and grammatically, to permit of an analysis of its words. Numerous

examples of such cases will be found in the following list. Much is gained, however, if the word has been properly assigned to the language to which it belongs.

Another difficulty is due to orthography, especially that used by the colonists, who, through a mishearing or misapprehension of the strange sounds of a strange language, wrote the same word in various forms, thus rendering its interpretation a question of the ear rather than of the eye. Good examples of this are afforded by the words Persimmon and Hickory.

The following list is, perhaps, not complete. I have omitted from it a few words that are found in books and are thought to be Indian (apparently for no other reason than that they are not English), but which require further study. In a study of North American plant names, it must not be forgotten that this country was settled by people of various nationalities, who naturally applied to our plants names derived from their own language. Among the numerous examples of such names may be mentioned Farkleberry, Fetterbush and Tupelo, a word that has always been thought to be Indian. Some of these foreign words have been so badly corrupted by English-speaking people as to be unrecognizable at first sight. As examples of such words I may mention Bilsted, Bonsemkrenia, Lash-Horn, Snargel, Sangrel, Klimmeth, etc. It must not be thought, then, that a word of uncouth appearance which is not English, and which apparently does not belong to any European language, is naturally North American Indian.

AMOLLE (*Chlorogalum pomeridianum*).—A name transferred to the plant from that of a saponaceous pulp which is formed by bruising the alkaline and mucilaginous bulb, and which is used for washing clothes. The word is from *amolli*, or *hamolli*, the Aztec name for soap.

ATAMASCO (*Zephyranthes Atamasco*).—"The Indians in Virginia do call it Attamusco" (Parkinson, *Paradisus*, p. 87). The word means "stained with red," and alludes to the color of the flowers.

CAMASS (*Camassia Fraseri*).—A Chinook Jargon word, with variants: Camas, Cammas, Quamash and Quamish. The name is from Nootka (Wakashan) *chamassish*, "sweet-tasted," alluding to the saccharine taste of the bulb when cooked.

CANCHALAGUA (*Erythraea venusta*), and also a general name for the various species of the genus in California, as well as in Panama, Ecuador and Chili. The name is a Spanish corruption of Araucanian (Chilian), *cachan-lahuen*, meaning "pleurisy herb."

CASHAW, or **CUSHAW** (*Cucurbita verrucosa*).—The "Cushaws," says Beverly (*Hist. Virginia*, ed. 1705, p. 27), "are a kind of Pompion, of a bluish green color, streaked with white, when they are fit for use. They are larger than the Pompions, and have a long narrow neck." Beverly adds that "perhaps this may be the Ecushaw of J. Hariot"; and Dr. J. H. Trumbull (*Bull. Torrey Bot. Club*, vi., 71) remarks that "in Hariot's *Virginia* the name [Cushaw] is given as Ecushaw." But these references are erroneous, since no such word as Ecushaw occurs in Hariot's *Briefe and true report of the new found land of Virginia* (1585). Nevertheless, in order to account for the name Cashaw, or Cushaw, we must suppose the former existence of the Virginian (Algonkin) word *ecushaw*, or *escushaw* (properly *askushaw*; Cree, *askisho*), which would mean "it is green," "unripe"; from the same root as the word Squash, *q. v.* Bartlett (*Dict. of Americanisms*) notes that the word is sometimes spelled Kershaw.

CASSENA (*Ilex vomitoria*)—From *cassiné* (as spelled by the French explorers of Florida in the sixteenth century), a name in the language of the Timucua Indians (a family long ago extinct) for an exhilarating beverage prepared from the leaves of the plant. The word has the appearance of having been borrowed, and modified by a prefix and suffix, from the Muscogee name *ássi*, "leaves," abbreviated from *ássi lupútski*, "little leaves." The Timucua borrowed several terms from the Muskogean dialects.

Foreign Correspondence.

Rhododendrons and Azaleas.

THE Rhododendrons are now at their highest state of perfection, and for many years there has not been such a profusion of bloom as this season, doubtless owing to the dry and warm summer of last year, which conduced to the formation of flower-buds instead of the growth of the plants. The public gardens and parks about London are brilliant with Rhododendrons and Azaleas, and especially Hyde Park, where, each year, a special feature is made of the finest specimens of the best sorts from the famous Knap Hill nurseries, in Surrey. This year Azaleas and Rhododendrons have mingled in bloom in a remarkable way, for generally Azaleas are past their best before the Rhododendrons are fairly out. One hears divided opinions as to their respective merits, and popular favor leans decidedly toward Azaleas now that the great number of varieties show so many subtle shades in their brilliant tints. But, really, they should not be compared with each other, and it is best to separate them, as is done at Kew, where in the Azalea garden one can only have a distant glimpse of the Rhododendrons. This principle should be followed whether planting on a large or small scale. This week I was one of the multitude who visited the famous Knap Hill nurseries, where the display of Rhododendrons excels that to be seen anywhere else in England. Here many acres of these American plants make a sea of bloom, the variety and brilliancy of which form a scene of indescribable beauty. Each year I think it quite the most impressive floral sight I have seen anywhere. But I went to Knap Hill especially to see the novelties that are sure to appear each season in such a vast collection, where systematic hybridizing is carried out thoroughly. Having regard to the multitude of splendid named varieties the standard of perfection is necessarily a high one with Mr. Anthony Waterer. Every seedling that does not conform to his ideal is rejected, although many persons might regard some of the rejected seedlings worthy of a name on account of the color or some exceptionally fine feature. In his opinion the perfect Rhododendron must first of all be of good constitution, with large and broad foliage, which he generally secures by breeding from the Catawbiense type. The flower-truss must be massive and a perfect cone and the flowers large, of perfect form and with short foot-stalks, so as to hold themselves together and not be injured by wind or rain. Then, if the seedling conforms to all these conditions and proves itself distinct in color from any known named variety it is given a name. To any one with a less fastidious taste than Mr. Waterer there are at least a score of new seedlings that are well worthy of a name, but probably only a fourth of that number will be so distinguished, and the others will be sold as unnamed seedlings. Two of the seedlings were named on the day of my visit. These were G. A. Sims and Nancy Waterer. The first is quite the most brilliant hybrid Rhododendron I have seen, and is almost of the same tint as the original *R. arboreum*. It is almost needless to state that it has high qualities in size of truss and flower and luxuriant foliage. Its color stands out the most striking among a thousand others. The Nancy Waterer variety, on the other hand, is remarkable for delicacy of tint, and is, perhaps, now the finest of the white and spotted-flowered class. It has a huge truss, and the immense flat flowers show spreading petals of a pure warm white, the upper petal adorned with a large and conspicuous blotch of rufous tint. Both these superb varieties will, no doubt, be distributed this season. A seedling will probably be selected to be named Persimmon, after the winner of this year's Derby, it being Mr. Waterer's invariable custom to name a Rhododendron after the winner of this classic race. It is a good practice, as it fixes the date of a new variety. I believe the only exception to this custom was the year when the horse Common won the Derby. It was, perhaps, thought that the name might be misconstrued.

Passing from the seedling-ground we were showed about

in the general collection, and it would be a difficult task to mention all the splendid sorts that fixed my attention there. A few first-class kinds which Mr. Waterer named as peculiarly adapted to gardens in America were Mrs. C. S. Sargent, one of the loveliest of all varieties, best described as a pink *Everestianum*, as it partakes of all the good qualities of that sort; F. L. Ames, Mrs. S. Simpson, Mrs. Hunnewell, Mrs. Price Lade, Lady Gray Egerton, Mrs. R. S. Holford, Sigismund Rucker, Sappho, J. Marshall Brooks, Martin H. Sutton, Marchioness of Lansdowne, H. W. Sargent, H. H. Hunnewell, Harry Veitch, C. S. Sargent. The last named is in bud this week, and is valuable on account of its lateness.

The seedling Azaleas, to the crossing and raising of which Mr. Waterer has given so much time and care of late years, are wonderful, all the more so, considering the scanty material that has been worked upon. In size of flower they rival the Rhododendrons, while for exquisite and subtle shades of tint they are beyond description. One sees the most fiery scarlets, the richest yellows, the purest whites, and every gradation of color between these extremes. Unfortunately, none of these seedlings can be described individually by name, as Mr. Waterer is even more reserved in naming the Azaleas than the Rhododendrons. Only a few of extraordinary merit are so distinguished. So many worthless old varieties are named that all but those having the highest qualities are sent out simply as Knap Hill Azaleas. I am inclined to think that some sorts of exceptional merit will receive names this year, especially some of the very large flat-flowered forms, and a new type of double-flowered sorts that I saw for the first time. One of these has a dense cluster of clear pink flowers on long branches that recall at once some of the finer sorts of double-flowered ivy-leaved *Pelargoniums*. These double flowers last so long and carry their blooms so well that they are especially adapted for cutting, and will some day be a valuable addition to market florists for cut flowers.

At Kew and a few other places this year a great feature among Rhododendrons has been the new race of hybrids that have sprung from the *Fortunei* type. They afford a new phase of beauty as regards form of flower and color, but do not conform in truss with the standard fixed for the other race. The flowers have long foot stalks and loose trusses, and therefore cannot hold themselves up in rough weather. They are, nevertheless, a decided gain, and it is only a matter of time to remedy the defects if careful selection and crossing is persevered in. At Kew some of these hybrids have been lovely, particularly those recently named Mrs. Thiselton Dyer and F. Thiselton Dyer. According to Mr. Watson they are the result of intercrossing *R. Fortunei* and *R. Thomsoni*. They are of luxuriant growth and have large trusses of widely open flowers, ranging from a blush white to a deep rosy red, and invariably a conspicuous blotch of carmine on the upper petal and a blotch of deeper hue at the base of the corolla. Mr. George Paul, of the Cheshunt Rose nursery, has been working at these hybrids in the same direction, and he has produced some remarkable ones which may in time become first-rate varieties. I do not think these will be suitable for America, except in the western and southern states, as they flower much earlier than the *Catawbiense* and other hybrids.

ROSES.—The long spell of drought and heat has retarded the opening of buds on Roses, and the plants have had a hard struggle with insect pests, but there is one race of Roses that seems to defy these drawbacks and is on the high tide of beauty. These are the Ramanas Rose hybrids, *Rosa rugosa*, and no flowers are more delightful at Kew this week. Two of the Continental varieties are flowering profusely. One is a pure double white named Coubert. It is much like *R. rugosa* in habit of foliage, more dwarf and bushy, while every shoot carries a cluster of deliciously scented flowers of the purest white. The other variety is Belle Poitvine, which is like Coubert in habit, but the semidouble flowers are carmine-purple and scented. These are first-rate garden Roses, as they continue a long time in

bloom. Two other hybrids are quite distinct from the latter in growth, as they tend rather to a rambling habit and long shoots. These are the Dawson and Mrs. A. Waterer. The Dawson has pale rosy pink flowers in profusion all along its spreading slender shoots. Mrs. A. Waterer is a cross between *R. rugosa* and General Jacqueminot, and was raised some years ago by Mr. A. Waterer, Jr., at Knap Hill. It is a spreading grower, and every shoot is densely wreathed with double flowers of a deep crimson and possesses a most powerful perfume. These two Roses are unquestionably among the finest we have for planting in places where they can spread about in a free way. All who see them are charmed with them. I wrote last week about Paul's Carmine Pillar Rose, which is the finest early variety I know, the profusion of large, single, brilliant crimson flowers being highly effective. It is still in perfection, and is associated this week with Crimson Rambler, which bids fair to become one of the commonest garden Roses. Every garden should include this half dozen Roses.

We are having a glorious season for trees and shrubs, and some Magnolias have never been finer in this country. We are now enjoying the grand American species, *M. tripetala* and *M. Fraseri*, both noble trees in or out of flower. The aromatic fragrance of these two Magnolias and of *M. glauca* perfumes the Azalea garden at Kew. The most remarkable flowering shrubs at Kew this week are the dwarf Leguminosæ, *Cytisus scoparius Andreana*, quite the most beautiful of its tribe, and in splendid condition this year. There are two new hybrid *Cytisus* raised at Kew worthy of special notice. One has been named *C. Kewensis*. It is a cross between *C. Ardoini* and *C. alba*, and is quite intermediate between those species as regards the flower, which is about the size of that of *C. alba* and pale yellow in color. It is distinct from either in habit, being quite prostrate, and spreading on the ground. There is a mass a yard across, and the flowers are so profuse that the foliage, which is trifoliate, is hidden. This is a valuable acquisition among dwarf shrubs for the rock garden, or on any position where its slender shoots can fall over a ledge to display the graceful growth of the plant. Another form of it from the same cross differs in the much deeper yellow and rufous color of its blossoms.

Kew.

William Goldring.

Plant Notes.

STYRAX GRANDIFOLIA.—The so-called large-leaved *Styrax*, although a native shrub, is rarely seen in American gardens. It is a first-class ornamental plant and should be better known. It has recently been in blossom in the Meehan nurseries in Germantown, Pennsylvania, and its white flowers are well set off by the large and generally obovate leaves, which are green above and soft gray and downy beneath. The blossoms are borne on elongated racemes and they open successively from the base toward the tip, so that flowers near the apex are still opening long after those first expanded have fallen. It is a large, vigorous shrub when well grown, sometimes attaining ten or twelve feet in height, but it only reaches its best development in the southern states, where it is most at home. Although it will grow well in many places where the climate is not much more severe than at Philadelphia, it is not likely to thrive much farther north than New York, and is not generally considered hardy in New England.

STYRAX AMERICANA is more dwarf and more hardy than *S. grandifolia* and will live and flower a good deal farther north. It flowers at the same time as *S. grandifolia*. The pure white flowers are open, bell-shaped, pendulous, solitary, or in very short and few-flowered racemes, and they have a faint but distinct and sweet fragrance. The leaves are small, or from one-third to one-half the size of those of *S. grandifolia*, and they are green and smooth or nearly smooth on both surfaces. The habit of the plant is open, and it will thrive as far north as Massachusetts without protection in winter, although it is not found wild north of Virginia.

PHELLDENDRON AMURENSE.—This tree, which in general appearance resembles the *Ailanthus*, and is almost as rapid a grower, has proved itself desirable for street-planting. It is especially valuable for the southern and western states. Insects do not appear to attack it, probably owing to the rank balsamic odor of the sap. The leaves, which are pinnate, with a terminal leaflet, sometimes attain a length of more than three feet. The trees are dioecious, and the fruit, which is freely produced when the sexes are in close proximity, is small and borne in clusters, which are almost black when ripe. *Phellodendron amurense* is also known as the Chinese Cork-tree. It is perfectly hardy about Philadelphia and as far north as central Massachusetts.

Clematis Suksdorfii (see illustration on this page) was first distinguished by Mr. W. N. Suksdorf, who found it in July, 1881, on the banks of the Klickitat River, in Washington.*

Cultural Department.

Notes from the Herbaceous Border.

HEMEROCALLIS DUMORTIERI is a distinct, free-growing, ornamental, hardy perennial. It is more floriferous than *H. flava*, although, perhaps, the flowers are not quite so pleasing in color. It grows fast in a suitable position, and small plants obtained a few years ago are now two feet in



Fig. 36.—*Clematis Suksdorfii*.

1. A flowering branch, natural size. 2. A flower, natural size. 3. A fruiting carpel, natural size. 4. A head of fruits, natural size.

New or Little-known Plants.

Clematis Suksdorfii.

THIS little-known *Clematis* of the *Flammula* section resembles in habit and foliage the widely distributed and variable *Clematis ligusticifolia*, the western representative of our common eastern Virgin's Bower. From *Clematis ligusticifolia* it appears to differ in its much smaller and fewer-fruited carpels, the ripe heads being not more than an inch in diameter, including the curling tails. The leaves are quinate, with glabrous leaflets from an inch to an inch and a half in length, and the spreading or reflexed white sepals are coated with pubescence on the lower surface.

diameter. One of these plants has just borne seventy flower-scapes. *H. Dumortieri* has long, narrow, tapering deep green leaves, measuring eighteen inches or slightly more in length. The numerous flower-scapes are nearly erect, about two feet in length, and they comprise three or four flowers. The individual flowers are of good size, orange-yellow and tinged with brown on the outside. Like all other Day Lilies, the flowers are ephemeral, but they open in succession and the scapes do not all blossom at the same time. The flowers lack the fragrance of those of *H. flava*. It is a fast grower, and for large specimens the plants should not be crowded. A fairly rich soil, and not too much shade, suits it well. This Day Lily is a native of Japan and eastern Siberia. It is also known by the specific names *rutilans* and *Sieboldii*. *H. flava* has blossomed

* Robinson, *Syn. Fl. N. Am.*, 1, pt. 1, 47 (1895).

well this year, and its large, clear yellow fragrant flowers are conspicuous at a considerable distance.

Some of the *Pentstemons* are beautiful now. The more tender species are unsatisfactory when grown all the year through in the border. They succeed the first year after being raised from seed, but if left in the border during winter the plants are weak in the spring and do not grow satisfactorily the second year. However, many of them will stand lifting in the fall, and they keep well in a cold frame during the winter. Whenever the ground is suitable for working in spring they can be planted in the border again, where they soon begin to grow. Other beautiful tender species make stronger, healthier and more compact plants if raised annually from seeds sown in January.

Fortunately, we have a number of species as hardy and as easily grown as our commonest perennials. Those with weak constitutions are, however, well worth this extra trouble of lifting, as is shown by a batch of the beautiful *Pentstemon secundiflorus* now in bloom here. The height of this *Pentstemon* is about fifteen inches, and the stems are clothed with narrow, smooth, lanceolate leaves. The flowers are in long panicles. The showy corolla is fully one inch long and of a mauve-purple color. This handsome species is found in the mountains of Colorado, and is said to be common at an altitude of eight or nine thousand feet. *P. diffusus* is quite hardy here and is flowering freely now. In spring the plants are cut well back and all the dead and weak growths removed. They soon make young shoots with nice healthy foliage. It is a vigorous grower and has stems nearly two feet in height, with opposite dark green oblong-lanceolate and deeply serrated leaves. The flowers are of a light purple color, showy, are produced in dense panicles and last for some time. *P. pubescens* is another reliable species easy to grow. The flowers of this plant are in pleasing contrast with those of the other *Pentstemons* now in blossom. There seem to be two forms of *P. pubescens*; one which we have here grows nearly two feet in height, while the other hardly reaches a foot. The leaves are light green; the lower ones measure more than three inches and are lanceolate in shape. The drooping flowers are in a loose thyrse. The upper part of the corolla is of a dull purple, and the lower half of a whitish color. *P. ovatus* is perfectly hardy, growing from two to three feet high, with short thyrses of rather small showy purple flowers. *P. lævigatus digitalis* makes fine vigorous plants and has flower-stems a yard long, with plenty of whitish flowers. The dwarf plants of *P. confertus* (cærulea-purpurea) bear pretty blue-purple and violet-colored flowers. *P. Clevelandi* has showy crimson flowers, but the plants do not seem to be perfectly at home here.

The *Bellflowers* are beginning to blossom, and they are always pleasing and attractive. The strong-growing kinds grow well in any ordinary well-enriched garden soil. The dwarf kinds are best adapted for the rock garden, although some of them, such as *Campanula Carpathica* and its varieties, are among our best plants for the front row of the herbaceous border. The Peach-leaved *Bellflower*, *C. persicifolia*, has opened its blue flowers in long showy racemes. Its white variety is an extremely handsome perennial, and always attracts a great deal of attention at this season. *C. Sibirica* is a biennial hardy species, floriferous, and making a neat and compact plant. Its height makes it especially useful. Its stems are branched and measure about eighteen inches. The large flowers are purple-violet in color and are produced in panicles. *C. latifolia macranth* is a thrifty plant with long stout stems three to four feet high. When well flowered it is a handsome sort. The flowers are large, of a purplish blue color and are in a spicate raceme. *C. nobilis* is a distinct plant about two feet high, and the form now in bloom has reddish violet flowers. *C. Portenschlagina* is a dwarf species suitable for the rock garden. At this time it is one mass of almost erect, small, light blue-purple flowers. It does best if it has a slight protection in the winter.

Salvia argentea, now in flower, is a bold silvery leaved biennial from southern Europe. It has distinct and attractive foliage, and small groups of the plants in the border are very noticeable. Its leaves are large, wrinkled, lobed and silvery, and vary in size from six inches to one foot in length; both sides of the leaf are covered with loose white wool. The height of the plant when in bloom is about three feet. The flowers are produced in whorls of from six to ten flowers in large panicles. The corolla is of a whitish color. The plant is more valuable for use as a foliage plant than for its flowers.

The *Phyteumas* are blooming better this year than they have done for some time. The showiest one in bloom is *P. Schenckzeri*, a plant from the European Alps, and it is quite

hardy here. It is about one foot in height, with ovate-lanceolate leaves, and those on the stem are linear lanceolate. The deep blue flowers are produced plentifully in spherical heads. Other species flowering now, and with blossoms of the same color as the above plant, are *P. Michelli* and its variety, with long narrow leaves, and *P. orbiculare*. They do best here in the rock garden in a position where they get plenty of light, although they grow fairly well in the border in well-drained soil.

The blossoms or flower-heads of *Helenium Hoopesii* are still in good condition on the same plants of which I wrote three weeks ago. The lasting qualities of the flower-heads of this handsome *Compositæ* are excellent.

Botanic Garden, Harvard University.

R. Cameron.

The Rock Garden.

THE rock garden continues attractive. Scattered patches of the Alpine Bugle, *Ajuga Genevensis*, are very handsome, and no blue-flowered rock plant can compare with it in depth of color—a rich indigo-blue. This species is the best of the genus, but all are pretty. *A. pyramidalis* is a giant among them, with spikes nearly a foot long, in whorls of light blue, labiate flowers. A bronzy leaved form of *A. pyramidalis* is used extensively in England for spring bedding. *A. reptans*, in the typical form, is, perhaps, the least attractive, but the white-flowered variety and the one with variegated leaves are well worth growing. *Gypsophila repens* is neat and pretty at all times. Just now its glaucous foliage is almost covered with the small starry white flowers. *G. cerastioides*, from the Himalayas, is scarcely hardy; whatever growth is made in summer is lost in winter, and it soon dies out. Some Rock Roses (*Helianthemum*) were lost last winter in exposed places. The orange-colored varieties appear to be harder than the purple varieties. *Callirhoe involucrata*, the Poppy Mallow of the west, is one of the prettiest of trailing plants. The stems are annual, and all start from a parsnip-like root-stock. The flowers are rose-colored, with a white centre, and arise, scape-like, from the axils of the leaves, throughout the length of the stems, from spring until autumn. It is an admirable little plant and can be confidently recommended for planting on rather dry slopes. The roots die out in a few years, but there are always seedlings enough to take their places. Poppies are general favorites. Though many of them are strictly border plants, all fit in well in the bolder groups on the rock garden. Blue Columbines, yellow Day Lilies and scarlet Poppies, especially the new hybrids of *P. orientale*, all go well together. In another group we may have the yellow Foxglove, *Digitalis ambigua*, *Geranium Ibericum platyptalum*, Violets with handsomely digitately palmate leaves, and Iceland Poppies. Such groups among carpets of *Phlox subulata* and other plants which scarcely rise above the ground make very interesting contrasts.

Aster alpinus speciosus is by far the best of all the dwarf perennial Asters. The flowers are nearly two inches in diameter, with a large yellow disk and mauve-colored ray-florets. It is hard to distinguish many of the single-flowered *Dianthus*, especially those with deeply fringed flowers, and which come from the Alps of Europe. *D. arenarius*, *D. Monspessulanus*, *D. fragrans*, *D. suavis* and *D. squarrosus* are names of kinds we have had. These varieties have merged so much in the seedling forms that it is difficult to make sure of their identity. *D. atrorubens* is distinct, with heads of deep red flowers; *D. latifolius* is a strong-growing kind, with large flowers. The Indian Pink, *D. Chinensis*, common now, is really beautiful, especially the single varieties. Although grown mostly as annuals, we have had plants live for several years. *D. deltoides*, the Maiden's Pink, is beautiful, and when once established takes care of itself. The Fire Pink, *Silene Virginica*, does well here. It must be allowed to run wild, as under cultivation it is difficult to grow. It is little more than a biennial, and it needs to be planted where it can sow itself freely. It is now perfectly at home in shady spots it has found for itself.

Astragalus Monspessulanus is represented here now by only one good plant. This subshrubby member of the Milk Vetch family should last for years, and go on increasing in size if favorably situated. Evidently we have not yet found its needs. It is uncertain whether summer's heat or winter's cold does most harm; it is to be noted, however, that the plants ripen prematurely, and it may be that the summers are too hot. The leaves are handsomely pinnate and arise from a creeping root-stock. The pink, pea-like flowers occur in short, decumbent spikes laid among the leaves with pretty effect. Violets include an interesting number of varieties and hybrids of *Viola cornuta* in white, yellow, violet and purple colors. They are showy, but short-lived; generally we have plenty of seedlings. The

Horned Rampions, *Phyteumas*, are interesting and lovely allies of the Bellworts, *Campanulas*. *Phyteuma Michellii* is a neat tufted kind, with blue flowers in heads on stalks nearly a foot long. In the bud state the corollas appear pointed. This peculiar pointed condition continues for a long time, for even when the flowers are open it is only in the lower part of the corolla that the lobes separate, and often the tips remain united when the function of blossoming is past.

Campanula Carpathica in several varieties is now opening, with its allies *C. coespitosa* and *C. turbinata*. These will continue until frost. *Oenothera Missouriensis* opened its first flowers a few days ago. They are altogether out of proportion to the size of the plant; in fact, I do not know another Evening Primrose with flowers as large. The large-winged capsules are also remarkable, and on this account it was once named *macrocarpa*. *Ramondia Pyrenaica* has been in bloom for nearly a month. The flowers are few, on branched scapes, rotate, and violet-colored. It is, perhaps, more interesting than beautiful. It is the Rosette Mullein and was once named *Verbascum myconi*. It grows on the Pyrenees and in fissures of rock, often facing vertically, and is considered a difficult plant in cultivation; as is often the case with other plants difficult to grow, we are liable to set down the cause to the severity of the winter.

Wellesley, Mass.

T. D. Hatfield.

Clerodendrons.

AMONG the many summer-flowering plants well adapted for conservatory decoration few are more showy than the climbing *Clerodendrons*, and while these are by no means new plants, they are uncommon enough to attract attention when well grown. They are not difficult to cultivate; liberal treatment during the growing season and a subsequent period of rest to ripen the wood are among the chief requisites.

Where space will permit, these plants may be planted out in a prepared bed and trained up on a trellis or on wires strung along the roof of the house. Grown in this way they are, however, less under control in regard to the time of blooming, and pot-culture is for this reason more convenient. By liberal treatment is implied a rich soil, abundant moisture and a fair amount of heat. But little shading will be found necessary at any season, except during the period of flowering, when some protection from strong sunshine will help to prolong the life of the flowers.

The *Clerodendrons* are strong-rooting plants and require a fair amount of pot-room. Young plants may be shifted on quite rapidly at this season, using as a foundation for the compost some good loam, to which should be added a sprinkling of sand, a small proportion of bone-dust and about one-sixth of dry cow-manure. If the loam is inclined to be clayey I prefer to use a portion of peat with it in order to render it more open, but this is not necessary with friable, turfy loam. As the growth progresses the shoots should be supported by stakes, wires or strings, and thorough syringing will be required to prevent the attack of red spiders. By September the growth will be sufficiently advanced to begin the ripening process; this is brought about by gradually withholding water and giving abundant ventilation. The plants may be held in this dormant condition until spring by keeping them dry and in a temperature of about fifty-five degrees. They should then be pruned moderately, the growths tied down to a suitable trellis, and with thorough watering and frequent syringing a good break of flowering shoots will result.

Nothing has been said about repotting the plants in the spring; it is preferable to defer this operation until after the plants have bloomed; otherwise a rank growth of wood and few flowers is likely to be the result.

The propagation of the climbing *Clerodendrons* is quite easy, and may be effected either by cuttings of two or more joints in length, and formed from firm young growths, or by means of root-cuttings. The latter should be made from the thicker roots, cut up into about two-inch lengths and buried to a depth of half an inch in pots of sand or in sandy soil. In either case the cuttings should be placed in a warm propagating-frame.

Among the species and varieties to which these notes will best apply are the well-known *Clerodendron Thompsonæ*; this is probably the most abundant bloomer of them all, and produces panicles of bright crimson flowers which project from showy pure white calyces. *C. splendens*, a strong-growing and large-leaved species with scarlet flowers, and the form known as *C. speciosissima*, which is an improvement on its parent, *C. speciosa*, is stated to be a hybrid between *C. Thompsonæ* and *C. splendens*, and is also an admirable variety; the

flowers are deep rose in color, and the calyces are also somewhat tinted with a similar color.

Holmesburg, Pa.

W. H. Taplin.

Strawberries.

OUR first gathering of this fruit was made this year on May 30th, fully a week earlier than in ordinary seasons. The earliest sort to ripen was Leader, which came in three days before Michel's Early. Leader has proved itself much the best variety with us; its berries are of good size and form, and of a fine rich crimson color. In flavor and quality Michel's Early is, however, slightly superior. For our main crop we grow chiefly Bubach No. 5, Belmont and Marshall. Marshall did rather indifferently with us last year and the foliage was badly affected with leaf-blight during the autumn. It stood the winter as well as any kind, and this year is giving a heavy crop of large, handsome berries, the two-year-old plants being especially thrifty. For exhibition purposes Marshall is the best strawberry of which I know, and some marvelously fine dishes have been shown at the Boston Strawberry show during the past three seasons. Complaints are quite general, however, that it winter-kills badly and is not a profitable variety for market-growers to handle. It is a vigorous grower and is easily distinguishable from any other sort. The fruit is of a beautiful rich crimson color and of fine flavor. Bubach No. 5 and Belmont are more grown in this locality than any other varieties. The extensive Strawberry fields in Dighton, Massachusetts, which supply Boston and other large New England markets, grow more of these two sorts than of all others combined. We have tried Parker Earle for two seasons; it is a good late variety and sets an immense quantity of fruit, more, in fact, than it can properly mature. It is usurping Sharpless to some extent, although a little inferior in flavor. Timbrell is proving an extremely productive sort, of superior flavor, but the rather peculiar mottled appearance of the fruit will operate against its being grown extensively for market.

We begin to layer our plants for a new plantation about June 20th, using three and four inch pots for the purpose. We do not sink these pots in the ground, and one good watering a day suffices when they are stood on the surface. As soon as the pots commence to fill with roots we remove the plants and stand them in a batch where they can be more conveniently watered. We like to have the plants set out by August. The earlier this is done the better the prospects are for a fine crop the following year. We plant in heavily manured ground, allowing the plants eighteen inches apart in the rows and the same distance between the rows. Between every fourth row we leave a two-foot path. We do not find it profitable to fruit the plants more than two seasons. The finest fruit is produced the first season, but two-year-old plants give the heaviest yield. After planting out our runners we give the bed a thorough soaking of water, and also whenever the ground becomes dry while the plants continue to grow.

Taunton, Mass.

W. N. Craig.

Correspondence.

A Garden of Single Roses.

To the Editor of GARDEN AND FOREST:

Sir,—Although the many different varieties of single Roses have often been described in GARDEN AND FOREST, it may be of interest to some to know the result of a small garden formed of the different varieties of these plants.

In the spring of 1894, about twenty small Roses were planted, mainly obtained from the Arnold Arboretum, and after two seasons most of these plants have become good bushy specimens, covered with bloom each spring. While some of these, especially the Japanese varieties, are well known, most of them are seldom seen, except in our public parks, where they make a fine effect planted in large masses.

The earliest Rose in my collection is the European *Rosa alpina*, a plant of vigorous growth, forming a large dense bush of a somewhat stiff habit. Its foliage is a pleasing light green, and it seems to be well adapted for a garden hedge. It is closely followed by *Rosa blanda*, a charming plant of graceful habit; both of these Roses have fine pink flowers, with but few thorns, and are well worth growing. Another early Rose, and perhaps the best of all, is the Scotch Rose, *Rosa spinosissima*, a low-growing plant with fine dark foliage, and an object of great beauty when covered with its garlands of white flowers. Its foliage is retained very late in the autumn, and this makes it especially valuable. There is a counterpart of this Rose

called *Rosa grandiflora*, the only apparent difference being the larger size of the flowers borne by the latter.

After these early Roses, the better-known Japanese *Rosa rugosa* appears, the white form of which is excellent. It has the advantage of being a constant bloomer, and, near the sea, it is covered in autumn with large, showy hips. Also from Japan is the large-growing *Rosa multiflora*, its innumerable tiny white flowers greatly resembling the bloom of the Blackberry. It is equally valuable grown as a large bush or as a climber. Another pretty plant that can be treated in the same way is the Field Rose, *Rosa repens*, with its modest white flowers and delicate foliage.

Among the more striking Roses the Copper Austrian Brier, *Rosa lutea punicea*, easily heads the list, with petals scarlet above and yellow beneath, while *Rosa rubrifolia* is conspicuous on account of the deep purple color of its foliage. If a suitable place can be found for *Rosa Wichuraiana* to grow in it will certainly be of great value, with its fine glossy foliage and small white flowers. At Dosoris it has been grown successfully as a climber, but treated in this way here its long shoots were killed during the past winter, although other plants allowed to creep on the ground were uninjured. We have but one native climbing Rose hardy in the north, *Rosa setigera*, but it is one of great beauty, blooming when most other Roses are past. Grown on a trellis, or allowed to hang over a steep bank, it forms a handsome object with its large pink flowers. *Rosa lucida* and *Rosa Carolina*, our native upland and lowland Roses, are both well worth growing, especially the former, which makes a large, strong bush, with fine glossy foliage. Last, but not least, is the well-known Sweetbrier, *Rosa rubiginosa*, which has made itself so much at home in our fields and pastures as to be almost a native, and whose delightful odor permeates the whole garden. Last year a set of hybrids from this Rose was sent from England that promise to be of great value. Although a large bush of the common Sweetbrier was badly injured by the unusually severe winter, these small plants are all in good condition and are now coming into bloom. They fully equal the description accompanying them. They have all retained the delightful Brier odor and are of a great variety of color. The best one I have is the variety called Lord Penzance, resembling somewhat the Copper Austrian Brier, in paler tones, with the same combination of yellow and deep red. Lady Penzance is a very light pink, delicately shaded with yellow. Meg Merrilles is a deep crimson, while Lucy Ashton is almost white. If these Roses prove to be as vigorous in growth and as free bloomers as the common type they will be a most welcome and valuable addition to our gardens.

Of course, a list of this character could be almost indefinitely extended, but those I have mentioned will make a collection of considerable variety, and include, I believe, the most distinctive forms. All of these are hardy at Boston, and are not particular about soil or treatment, and, with me at least, have few enemies of any importance. If it is not considered desirable to grow them by themselves, they make excellent subjects for the general shrubbery. A little farther south the list could be greatly extended, especially by the addition of *Rosa moschata nivea*. This beautiful Rose, after passing through two winters with but slight injury, was killed to the ground this year. It is strong-growing, throwing out arching stems from six to eight feet long, covered with white flowers of great beauty.

There have been many hybrids formed lately from these Roses, one well-known one, the Dawson Rose, having small semidouble pink flowers and retaining the habit and hardiness of its parent, *Rosa multiflora*. A pink form of *R. Wichuraiana* has, I believe, been created, and undoubtedly many more will follow.

As an edging for the larger-growing Roses, the small Fairy Roses, *Rosa polyantha*, can be used. Unfortunately, these Roses are not very hardy, but they are so easily grown from cuttings that they should be more generally planted.

Wellesley, Mass.

H. S. H.

Climbers and other Plants in Northampton.

To the Editor of GARDEN AND FOREST:

Sir,—A *Wistaria Chinensis* sixty-five feet high and covering a width of thirty-five feet, is not often met with in this country, but a plant of the above dimensions is now growing on a southern exposure against the main building of the State Lunatic Asylum, located at Northampton, Massachusetts. The stem at eighteen inches from the ground is three feet in circumference, and Mr. J. Thornley, the head gardener, informed me that the vine was planted there twenty-seven years ago,

and that a year ago more than one-half was cut away to make room for needed improvements to the building. It is very vigorous and looks as though it would, if allowed, soon cover the whole building. It is a magnificent sight when in full bloom, but this year, owing to the unusual winter, it has not produced half the usual number of blossoms.

On an eastern aspect of the same building is a fine specimen of the climbing *Hydrangea*, *Schizophragma hydrangeoides*, which occupies a space forty-five feet high by about thirty wide. It is now in full bloom, and a magnificent sight with its large corymbs of *Hydrangea*-like blossoms against the dark, shining green leaves. For a large building of brick or stone this climber, in my opinion, is without a peer. It requires no attention in the matter of pruning or training, as it clings to the walls by its aerial roots, and is perfectly hardy. It is a native of Japan, and is easily propagated by cuttings or seeds. This vine was planted about thirteen years ago, but must soon be cut away for an extension to be made to the building.

The late Dr. Pliny Earle, who presided over this institution for many years, was a great lover of trees, shrubs and natural scenery, and many fine specimens of trees may be seen in the grounds. Among some I noticed particularly was a good specimen of the English Oak, *Quercus Robur*, also a fine English Ash. Near one corner of the building was a *Magnolia acuminata* thirty-five feet in height and a perfect specimen. Some fine groups of *Exochorda grandiflora*, *Cercis Canadensis*, *Amelanchiers* and many other spring-blooming shrubs are to be found here. Farther away from the building are tracts of woods which have received intelligent care. The greenhouses belonging to the institution contain a useful collection of foliage and flowering plants, the *Begonias* being exceptionally well grown and the Roses remarkably vigorous.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Pyrus coronaria.

To the Editor of GARDEN AND FOREST:

Sir,—The native Crab Apple has rarely appeared so beautiful at the time of flowering as in the spring just past. As was remarked in GARDEN AND FOREST, May 27th, the flowers do not appear till the leaves are partly grown, so that they are somewhat hidden by the young foliage. This is less noticeable here than in the east, for the interval between the opening of the leaf-buds and flower-buds is shorter. But this year the season was peculiar; their development was practically synchronous, and the leaves were so small when the flowers were fully expanded as to be obscured or almost hidden, enough of the green color coming into sight to set off the pink and white of the buds and flowers and make a beautiful combination. The flowers were uncommonly plentiful. It is doubtful if a finer display could be made by any native floral tree than the wild Crab showed under these conditions, especially when the trees stood alone, or partially in the open ground bordering the Oak woods, or lined the banks of a stream. They were so bright as to be visible a long way off, masses of pink dotting the meadows and pastures, or appearing in relief against the groves of Oak, around whose expanding leaves of yellow and red and hanging tufts of flowers a misty light was playing. All combined to make a fairy scene of the woods and fields in those summer days in spring, a picture long to be remembered. They were a month in advance of their usual flowering season, which in ordinary years is from the 20th of May to the end of the month. This year they began to open by the 25th of April, and I saw them at their best on the 29th—a month earlier than I found them in flower last year, when in the higher parts of the finger-lake region of western New York.

Another feature of the blossoms this year struck me as unusual. They are generally so fragrant as to perfume the air for some distance away, and the first reminder of their presence in the denser parts of the woods may be a sniff of the air laden with their delicious aroma. The fragrance in the season just past was so subdued as to be barely perceptible when standing close by the trees. I have wondered whether this loss of fragrance was made at the cost of their rapid development, because more time was needed for its perfection. I have since remarked the same condition in the case of our wild Grapes. Seasons peculiar as this has been are rare, when the cold of the early part retarded vegetation, and a continuous summer heat suddenly setting in hastened growth with remarkable rapidity. It is difficult to correlate observations of this kind, but the facts were evident and may well be kept in mind.

Chicago, Ill.

E. J. Hill.

Meetings of Societies.

The So-called Exhaustion of Nursery Lands.

THE most vital question with nurserymen at the present time is that of the unproductiveness of lands which have grown one crop of trees. All nurserymen declare that one crop of fruit-tree stock cannot immediately follow another with any assurance of success. This important question received serious consideration in an address by Professor L. H. Bailey before the American Association of Nurserymen at Indianapolis last year, in the tenth report of the New York State Experiment Station and in Bulletins 102 and 103 of the Cornell Station. Professor Bailey discussed the subject more specifically at the meeting of the Nurserymen's Association in Chicago, on the 11th instant, and some of the points which he made are here given:

a. THE FERTILITY OF THE SOIL.

There are two analytical means of determining the fertility of the land. One method determines the chemical constitution, and the other the mechanical or physical condition.

Chemistry determines the amount and kind of plant-food in the soil, but it cannot tell just how useful this food may be to the plant. This depends upon the physical condition of the land, or upon the relation of the soil to warmth, moisture, air and mechanical constitution. The plant is not simply a passive agent, taking in the food which is presented to it, but it is actively engaged in searching for and appropriating food.

The actual fertility of the soil depends, therefore, upon the plant as well as upon the land. The better and more comfortable the plant, the more food it can appropriate from a given soil; hence that soil is practically the richer. The chemist does not determine the physical conditions which make the plant comfortable and active. In other words, the amount of plant-food in the soil is only one of the elements in the fertility of the land.

In most instances as much depends upon the physical condition of the soil as upon its chemical constitution, and in many cases even more depends upon it.

Soil is derived from two sources—rock and organic matter. Each is essential to it. Without the rock matter it would lose body and staying qualities. Without the organic matter it would lose life or heat and activity.

Nature adds the organic matter to the soil by growing plants upon it and then incorporating their remains with it. Everywhere the process of soil-building is now going on. The longer the soil is in crops the richer it becomes, although the relative amount of mineral matter which it contains is decreasing at the same time.

Nature makes the soil richer, then, both by fining and digesting the mineral matter and by ameliorating its physical condition through the incorporation of humus or organic matter.

This fining process must ultimately cease, but the addition of humus never ceases. The final and complete enrichment of the soil, therefore, must come largely as the result of the incorporation of humus with it.

The chief value of this humus is not to directly afford plant-food, but to improve the conditions of temperature, moisture, aeration and the like.

b. MAN'S TREATMENT OF THE LAND.

Man's chief desire is to remove organic matter from the soil. He consumes the plant product. As a consequence, cultivated soils soon tend to become hard, dense, heavy and lifeless, and the more clay-like the land the more pronounced is the result.

The best and richest farm soils are those which are loamy—that is, those which are friable, soft and dark-colored. This loamy condition is brought about by the addition of stable-manures and green crops.

Every ordinary soil tends to lose its humus sooner than its plant-food, and most so-called exhausted soils are injured in their physical condition rather than exhausted of their fertility.

It follows, therefore, that the addition of mere plant-food cannot entirely restore the generality of worn-out lands. The physical condition must always receive first attention. The addition of commercial fertilizers is not a fundamental corrective of poor lands in the vast majority of cases. It should be considered as a supplement to the treatment of the land by means of tillage and cropping.

If man's reward from the cultivation of the land is so unlike nature's, it follows that one cannot copy the practices of nature in the treatment of the land. Yet, in every generation, there

are men who proclaim that because nature neither plows nor tills, therefore man should not. The only infallible guide to the proper treatment of the soil is experience, not science, nor speculation; but science explains the laws and directs the application of them when once experience has discovered them.

In fact, experience is law, for experience that persists is that which gives consecutively uniform results under like conditions. All experience proves that frequent tillage and the addition of humus quickly and invariably ameliorate and improve the soil. It is folly to attempt to controvert the facts by mere speculation. On the other hand, experience proves that the addition of chemical fertilizers does not invariably visibly benefit the soil; therefore the value of such applications must depend upon local or transient conditions.

c. THE NURSERY LANDS.

The best nursery lands, at least in New York state, are those which contain much clay. This soil is the most easily injured by unwise or careless treatment and by the loss of organic matter.

The nursery crop occupies the land for three to five years. During all this time the land receives no addition of organic matter, and finally even the roots are taken out of it. In very many cases the trees are planted and dug when the soil is wet or very dry, and, therefore, quickly and very seriously injured in its "grain," or its physical condition.

Nurserymen find that if the land is rested in Clover or Grass for a few years it will again grow trees. This rotation, like all others, is a means of ameliorating the physical condition of the soil as well as the chemical condition of it. A part of the rotation must aim at the incorporation of humus. Therefore every famous rotation has a rest crop in it.

An incidental advantage of any rotation is the variety of tillage imposed by it. A rotation of tools and of methods, and seasons of working the land, is often as important as the other results of alternate cropping.

[Extended figures of chemical analyses of nursery stock were presented, showing that the amounts of potash, phosphoric acid and nitrogen which such stock removes from the land is really very small, and less than that removed by similar bulk or weight of corn or wheat. Experiments now being made by Professor Bailey were cited, and these showed that the addition of concentrated or chemical manures to nursery-lands does not promise very important results; but Professor Bailey has greater hopes from experiments in the sowing of Crimson Clover and other cover crops in the nursery rows, and in the use of stable-manures. He cited instances of excellent results following the addition of stable-manure to nursery-lands between the trees in the fall; an instance was given of a piece of land so treated which has grown excellent Plum-trees for twenty consecutive years. Examples were also given to show that there is no necessary reason why nursery stock should not follow nursery stock as well as wheat follow wheat, except that the land is usually more clay-like, the rotation or cropping is longer, and the addition of humus or fibre to the soil is less.]

d. THE CONCLUSIONS.

The difficulty then is not one of amount of plant-food, so much as of the availability of that food by improving the physical conditions of the soil. The soil must be warm, soft, mellow, and the plant must be comfortable.

The trouble is, not that nursery trees take so much from the soil, but that the rotation is too long, the fibre is burned out of the soil, and much of the working of the land is untimely.

Certain lands are not readily injured by nursery cultivation, and these may grow several continuous crops of trees.

Now and then the nurseryman can augment the growth of his stock by extra attention to tillage (it is assumed that he always tills well) and by the addition of some quick nitrogen compound, as nitrate of soda; but these are generally only temporary correctives. The complete or fundamental corrective for nursery-land is rotation; but the length of this rotation may often be shortened, or even entirely reduced by the judicious intracultural use of stable manures and cover crops.

The conclusion was made that the physical condition of the soil is a subject of greater or earlier importance than its chemical constitution; that the value of rotation of crops lies largely in its ameliorating effect upon the physical condition; and that nursery-lands are no exception in demanding such rotation. Instead of thinking it strange that trees do not readily follow trees, we should rather think it strange if they did. Because the crop is of several years' duration, it becomes necessary that the alternating cropping should also be ex-

tended. A system of rotations must be practiced in blocks of years, not in single years. But this alternating cropping can be greatly shortened by giving greater attention to the addition of fibre to the soil while the nursery stock is growing. There are instances in which the alternation may be made short, and some in which there need be hardly any. Professor Bailey said that he did not look for a general corrective of the depletion of nursery-lands, therefore, by the addition of concentrated or chemical fertilizers, but by better management of the lands.

Notes.

Lima beans, from Virginia, the first of this season, sell for forty cents a half-peck, the pods but poorly filled, and Windsor or Broad beans at the same price. Corn is now coming from southern New Jersey, and costs fifty cents a dozen.

It was reported not long ago that among the twenty young women thus far graduated from the Horticultural College at Swansea, eight were growing fruit or vegetables for the market, one was the manager of a bulb-growing nursery and two were the managing gardeners of large estates, while the other eight were utilizing their acquirements at home.

The old home of the naturalist, Audubon, in Pennsylvania, is on the south bank of the little River Perkiomen, about three miles to the eastward of Phoenixville. The house, which is locally famous as the Mill Grove House, was built nearly a century and a half ago, and stands on a knoll which affords a fine prospect. It is of stone, solid and substantial, thickly overgrown with Ivy and shadowed by a number of tall Pines, under the branches of which Audubon produced some of his best work. In spite of certain interior changes, the chimney-corner where his studying was done still remains as he knew it.

The large white flowers and the purple stamens of the native shrub *Stuartia Virginica* were lately seen in flower in the Meehan nurseries, in Germantown, Pennsylvania, and the buds of *S. pentagyna* were about opening. A large specimen of *Pterostyrax hispidum*, twenty feet high and as many feet across, was covered with hundreds of racemes of drooping white flowers. These give a fringe-like character which resembles somewhat that of the *Chionanthus*. It seeds freely. *Cedrela Sinensis* was again in flower in these nurseries, as it was last year, the greenish white flowers borne on panicles two to three feet in length, and pendulous from the ends of the branches. The tree resembles *Ailanthus glandulosa* in appearance, but the flowers are entirely without odor.

A large variety of fruits is now shown in this city. All the berries are offered, as raspberries, blackberries, huckleberries, strawberries, currants and gooseberries. Cherries from western New York are plentiful. The first Le Conte pears are here from Florida, with the last apples from cold storage. The first grapes of the season, Niagaras, also came from Florida last week. Botan plums are coming from the same state, and the small Chickasaw and showy Wild Goose plums from the southern Atlantic coast states. There are apricots, peaches, plums and cherries from California, besides peaches from Florida and Georgia. Oranges and lemons are, of course, seen in the collections, and occasionally grape-fruit in excellent condition; medium-sized smooth specimens cost twenty cents each. Watermelons are coming by the car-load and by steamer; one boat from Savannah on Friday discharged thirty-three car-loads. Some large ripe muskmelons have been coming from New Orleans, but most of this fruit from South Carolina and Florida is small and immature.

The smudge fires which are kindled in orchards to raise a screen of smoke as a protection against frost are only effective, says Mr. F. C. Barker in the *Irrigation Age*, on a broad flat expanse of land, for in narrow valleys the cold air flows down from the hill-sides underneath the smoke. The smoke, like clouds, only acts as a screen to prevent radiation. Of course, the heat from the fires has practically no effect in reducing the intensity of the cold, but the efficiency of the fires may be greatly increased by spraying them with water, so as to add vapor to the atmosphere, and in this manner raise the dew-point, which is reached at a higher temperature when the vapor of the air is increased. Without this spraying the heat would otherwise establish an upward current of warm air which would rise above the space which required protection; while if water is sprayed on the fires the heat is utilized in forming vapor which is distributed through the lower strata of air, where it is most needed. As soon as this vapor is condensed at the dew-point this latent heat is set free and tends to raise the temperature.

The Apple orchards of Tasmania, from which a great deal of fruit is shipped to England every spring, have a very different appearance from those of western New York, for example. The trees are planted closely, sometimes twelve feet apart each way, but usually sixteen feet apart each way. They have a short main trunk or none at all, with from five to nine main branches starting as nearly as possible from the ground and forming an inverted cone open in the centre. Each of these branches is kept covered with fruit spurs as nearly as possible down to the ground, and, therefore, a large portion of the apples are borne below the point where our own trees carry any fruit at all. Summer pruning is practiced before the apples have matured, so as to check prolific growth and encourage fruiting, and partly to let the sun in and give the apples color. This also is the reason for having the centre of the tree open, because the fruit does not color as well as it does in climates which are drier and more sunny. In some cases a stake is driven into the ground near the trunk and passes up through the centre of the tree, and the branches are supported by binder's twine attached like umbrella braces to this central stake. In other cases props are used to hold up the limbs. A very interesting description of these orchards, with illustrations showing the low and closely pruned trees loaded with fruit, is found in *The Garden and Field*, published in Adelaide, South Australia.

The American Association of Nurserymen held its twenty-first annual meeting at the Sherman House, in Chicago, on the 10th and 11th instant. Of the various horticultural trade organizations of this country this association holds the chief place in the broad and catholic spirit of its management. Its purpose is the serious acquisition and diffusion of knowledge in all that pertains to the growing of woody plants, not only in the nursery, but in the orchard and on the lawn. Its membership is comprised almost wholly of the owners and managers of nursery businesses, and these are men whose sympathies are necessarily as broad as the cultivation of plants itself. A large part of its function must always be social, but its meetings are happily free from that type of conviviality which is often the discredit of trade or special gatherings. The chief interest in the Chicago meeting centred in questions relating to customs tariff on nursery-stock, and a committee (W. C. Barry, J. H. Hale, N. H. Albaugh) was appointed to aid in securing additions to the present tariffs; in the laws designed to prevent the free exchange of nursery-stock for the purpose of checking the spread of the San José scale and other pests, and which were condemned because considered to discriminate unjustly and to fail of their ostensible purpose; in the causes for the decline in prices of nursery-stock; and in the means of maintaining the productiveness of nursery-lands. The association is to meet in St. Louis in 1897, and its new officers are Silas Wilson, Iowa, President; E. Meissner, Missouri, Vice-President; George C. Seager, Rochester, New York, Secretary; N. A. Whitney, Illinois, Treasurer.

It will be of much interest to the scientific and gardening world to learn the extent of the damage done to the Missouri Botanical Garden by the destructive tornado that recently visited St. Louis. The garden was in the direct path of the wrecking wind at its extreme western point. As this was the starting point of the destruction the garden suffered less severely than the region just to the east, though the damage was considerable, more especially in the timbered portion. Something like 160 trees were either uprooted or broken off so near the ground that it was found necessary to take them out. Many of these were rare and choice plants, and an estimate of their value would be impossible. More than 250 trees were seriously damaged, many of them having their tops almost entirely carried away. Some of these, by judicious pruning, will, in a few years, grow to be beautiful trees again, while it is probable that a few will die. The shrubbery was badly whipped, but the damage to it was comparatively slight. The herbaceous plants were almost totally destroyed in the exposed places, but these are now all replaced by reserved stock. The grounds are rapidly being put in order, and in a month it is expected that all vestige of the storm will have been cleared away and only the vacant places left to indicate its awful work. It is fair to say that the damage is not so great as to mar the beauty of the garden nor to impair its usefulness as a place of instruction. In these particulars it will not suffer in the least. The injury to the buildings was mainly in broken windows and damaged roofs. The glass portion of the roof of one large greenhouse was entirely demolished, and the roof of the southern half of the herbarium and library building was carried away. By prompt action of the employees in the library building its contents received no damage whatever.

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Yew Trees.

IN England the Yew-tree has long been a favorite with planters, and the oldest trees in Europe are believed to be Yews which were old enough to influence the selection of the sites of some of the oldest churches now standing in Great Britain, or were planted when they were built. Some of these trees are certainly four or five centuries old, and their enormous stems and broad picturesque heads of dark foliage are fitting emblems of the longevity of the British nation. In Europe the Yew-tree has furnished, from the time of the ancients, the best material for the bow, and long after the Anglo-Saxon Conquest Yew-tree bows were the principal weapons of the English. In the United States the Yew has never been much planted, and is comparatively little known here in gardens. In the New England and other northern states the European species is not hardy, and in the middle states, where it flourishes, there has been less general interest in planting and gardening, during this generation at least, than in New England. Many fine old Yew-trees, nevertheless, may be seen in the neighborhood of this city and in the suburbs of Philadelphia, Baltimore and Washington, and the fact that this tree has remained so rare in this part of the country can only be accounted for by the fact that its slow growth has deterred Americans, who want quick results, from using it more generally. But now that it is known that the Japanese Yew, *Taxus cuspidata*, is perfectly hardy in the northern states and that it grows more rapidly than the European tree, it is probable that the Yew will play a more important part in the decoration of American gardens than it has before. The Japanese Yew is an inhabitant of Manchuria, Corea and Yezo, where it is scattered through the forests of Oaks and other deciduous-leaved trees, and where it rises to the height of fifty feet, often forming a tall straight stem two feet in diameter. A favorite with the Japanese, it is often found in their gardens trimmed into grotesque and fantastic shapes. The Japanese Yew was introduced into the United States thirty years ago through the agency of the Parsons' Nursery, in Flushing, Long Island, but gardeners are only just beginning to learn its beauty and value.

Taxus, which is confined to the northern hemisphere, is widely distributed through North America, Europe, north-

ern Africa and Asia, six species being recognized by botanists. The species, however, all resemble one another, except in habit and in some trivial leaf characters, and might as well be considered geographical forms as species, all six being practically identical in the structure of their flowers and fruit and in the character of their bark and wood. Three of these so-called species inhabit the United States; one is endemic in Mexico; one is widely scattered through Europe, northern Africa, and Asia, and the fourth is found only in eastern Asia. Of the species of our United States flora, one, *Taxus Canadensis*, which is a low shrub with wide-spreading, prostrate branches and a stout stem, is a common inhabitant of northern woods, forming dense carpets or low thickets in their shade from Newfoundland to the shores of Lake Winnipeg, and southward through the northern states to New Jersey and Minnesota. This plant is occasionally cultivated in northern gardens, where it might be used much more freely than it has been to cover moist ground shaded by trees. The other Yews of the United States are arborescent in habit, one being found growing in Florida and the other in the Pacific states. The Florida Yew, *Taxus Floridana*, which is one of the rarest of the North American trees, inhabits the bluffs and ravines of the eastern bank of the Apalachicola River, where it grows with the Florida *Torreya* in the territory extending southward from Aspalaga to Bristol, in Gaston County, for a distance of about thirty miles. *Taxus Floridana* is a bushy tree, rarely thirty feet high, with a short trunk occasionally a foot in diameter, and many stout, spreading branches. Although discovered as long ago as 1833, the fruit was seen for the first time last winter, and this handsome bushy tree appears to have remained unknown in gardens until the past winter, when living plants were introduced into Mr. Vanderbilt's arboretum on his estate at Biltmore, in North Carolina.

The second arborescent Yew in the United States, *Taxus brevifolia*, often attains a height of eighty feet, with a tall lobed trunk two or three feet in diameter. An inhabitant of the shady banks of mountain streams, damp ravines and deep gorges, growing usually under the shade of larger evergreens, it is distributed from Queen Charlotte's Islands and the valley of the Skena River in British Columbia southward on the Coast Mountains to the shores of the Bay of Monterey, in California; it also inhabits many of the interior ranges of British Columbia and the Cascade Mountains, ranging eastward over the mountains of eastern Washington and Oregon to the western slopes of the Rocky Mountains of Montana, and occurs on the western slopes of the Sierras of northern and central California, between elevations of five and eight thousand feet. The wood of this tree furnished the Indians of the north-west coast with the material from which they made their bows, the handles of their spears, their paddles and fish-hooks; and the white man finds it the most durable material for his fence-posts. Introduced into English gardens forty years ago, the western Yew is occasionally found in European collections. Unfortunately, this beautiful tree has not yet shown its capacity to withstand the severity of our eastern climate.

Of the fourth American species nothing is known beyond the fact that fifty years ago a German botanist collected specimens of a Yew-tree in southern Mexico, which was afterward described in Germany as *Taxus globosa*. Botanists who have traveled in Mexico in recent years have seen nothing of this plant, and there is nothing to say about it except to comment on the interest which would attach to its rediscovery.

The Yew-tree, however, in which the world has been interested since the time of the Greeks, is the Old World *Taxus baccata*. This is not only the best known of all the plants of the genus, but it surpasses them all in the richness and beauty of its dark lustrous foliage and in its size, individuals one hundred feet high, with trunks five or six, or even ten, feet in diameter being known. The Old World Yew, which usually grows in shady situations on the northern slopes of hills or under the cover of deciduous-leaved

trees, and is rarely gregarious, is spread all over western and central Europe, reaching southern Scandinavia on the north and ascending the mountains of southern Europe and northern Africa; in Asia it ranges from the Mediterranean to the temperate Himalayas, where it is common in the north-western provinces up to elevations of ten or twelve thousand feet above the sea, and where it appears to attain its largest size, and to northern China and Manchuria. The wood of this tree is strong, hard, flexible, elastic, easy to split and very durable. These qualities make it valuable to the manufacturer of bows, and no other wood which has ever been tried for this purpose equals that of the Yew. It is considered more valuable than that of any other European tree for cabinet-making, and for this purpose it is largely used for veneers. In India the Yew-tree is venerated and the wood is burnt as incense, its branches are carried in religious festivals, and the powdered bark is employed medicinally.

Stories of the poisonous properties of the Yew-tree have been rife for more than two thousand years, and in Europe numerous instances are cited of fatal results following the medicinal use of the leaves, and of the death of animals which had eaten them. There is no record, however, of any evil results from the browsing on Yew leaves in the United States; in India domestic animals are said to be regularly fed on Yew branches, and in Europe cases are reported of animals which have been gradually accustomed to a diet of Yew. The sweet, juicy red pulp which covers the stones is palatable to most people and is eaten without producing any ill effects; and flour made from the seeds has been successfully used in Europe to fatten poultry. It is hardly possible that the different species of this homomorphic genus can vary in toxic properties, or that the Old World Yew is more poisonous in Europe than it is in India, and the whole subject of the poisonous properties of the plants of this genus needs more careful investigation than it has received.

In the decoration of European gardens *Taxus baccata* has played an important part, especially during the seventeenth century, when, cut into all sorts of fantastic shapes, it was the pride of French, Dutch and English gardens. The Old World Yew is unsurpassed as a hedge plant, and is still one of the most generally planted evergreens in western and central Europe, where many abnormal forms are cultivated, the most distinct of these being the Fastigate or Florence Court or Irish Yew, found many years ago on an Irish mountain, the Dovaston or Weeping Yew, and varieties with gold-colored or silvery leaves. The readers of this journal are doubtless familiar with the appearance of the cultivated European Yew, with its compact bushy juvenile habit and its more mature pyramidal head, but in our illustration on page 265 of this issue they can see the portrait of a wild Yew-tree, a venerable specimen growing on the upper slopes of an Algerian mountain. Our illustration is from a photograph made by Monsieur Maurice L. de Vilmorin, of Paris, who has obligingly placed it at our disposal.

Plant Names of Indian Origin.—II.

CATALPA.—This word was first used by Mark Catesby (*Nat. Hist. Carolina, Florida, etc.*, i., p. 49; 1745), who gives no explanation of its origin or meaning. Speaking of the Catalpa, he says: "This tree was unknown to the inhabitants of Carolina till I brought the seeds from the remoter parts of the country." By the "remoter parts of the country" is probably meant Georgia, where the tree is indigenous, and into which Catesby made excursions while living in Carolina, between 1722 and 1726. This was formerly a part of the domain of the Muskhogean. Believing that the word was derived from one of the dialects of this family, I submitted it to Mrs. A. E. W. Robertson, of Muscogee, Indian Territory, who has a profound knowledge of the Muscogee language, and who tells me that it is undoubt-

edly from that dialect, and is a slight corruption of *ku'úhlpá*, meaning "winged head"—the name, to use her words, referring to the "shape and marking of the flower, with its winged border." From a supposition that the name was derived from that of a tribe of South Carolina Indians, the word was corrupted at an early period to *Cataba* and *Catawba*. *Patalpha*, another corruption of the word, is applied in the Lower Wabash and White River Valleys, Indiana, to *Catalpa speciosa*.

CHAPOTE (*Diospyros Texana*).—From Mexican-Spanish *sapote*, which is from Aztec *tsapoll*, a general name, in composition, in that language, for sweet, fleshy fruits. The name of the Mexican persimmon was *tliltzapoll*, meaning "black fruit."

CHIA (*Salvia Columbariæ*).—The Aztec name, according to Molina (*Vocab. Mexic.*), for the "oily seeds" of some plant.

CHICALOTE.—A popular name in southern California for *Argemone hispida*. It is from Aztec *chicalotl*, meaning "that which is spiny."

CHINKAPIN, or **CHINQUAPIN** (*Castanea pumila*).—"Many goodly groves of *Chincomen*-trees, with a huske like unto a chesnut" (R. Hamor, in *A true discourse of the present estate of Virginia* [about 1614]). The last syllable, *men*, in the above word is an Algonkin inseparable suffix, meaning "seed," "nut," or fruit." The erroneous change to *pin*, a suffix meaning "root," was made at quite an early period, as early, at least, as 1682. Captain Smith (*Hist. of Virginia*, about 1606-8) and Strachey (*Travails into Virginia*, about 1610) give the name in the reduplicated form, *chechinquamin* and *chichinquamin*. This renders the meaning of the first part of the word a little doubtful; but I think that, of the two possible interpretations, "rattle-nut" and "scratch fruit," the latter (which would refer to the stiff spiny character of the involucre) is the more probable. By the Pamlico Algonkins, further south, the fruit was called *sapúmmen* (Hariot, 1585), which may, perhaps, be regarded as the southern equivalent of *sabómin* and *jabómin*, "pierce-fruit," names in Cree and Odjibway, respectively, for the prickly fruit of *Ribes Cynosbati*.

CINQUE (*Triosteum perfoliatum*).—A name of the plant given by Clayton (*Flora Virgin.*). Rafinesque (*Med. Flor.*, ii., 269) speaks of the plant as the "Sincky of the Indians." The name, except as a synonym in works on *Materia Medica*, is probably obsolete. If Indian, it is an Algonkin word, and either from *sinnegeu*, "it is stony," or an abbreviation of *sinnegemin*, "stony seed," referring to the bony character of the nutlets.

CLAMOUN.—A name in Massachusetts for *Kalmia latifolia*, thought to be of Indian origin. If so, it is a contraction of *kullamoun* for *kunnamoun*, "spoon material." The wood, which is soft when fresh, becomes hard and dense, and was used by the aborigines for making spoons.

COAKUM (*Phytolacca decandra*).—This name, with its variants *Cocum* and *Cunicum*, is a word of Indian (Tarascan) origin, but not of Indian application. Rafinesque (*Med. Fl.*, ii., 25) says that the *Phytolacca* is the "Coakum of northern tribes," and this statement has been repeated. The "northern tribes" in this instance were the colonists of Massachusetts, who formed the word through a corruption of Mechoacan, an old pharmaceutical name for a purgative root derived from the Mexican province so called, and afterward extended to the roots of other plants that had similar medicinal properties. Mechoacan is a Tarascan word, meaning "fish-land."

COCASH (*Aster puniceus*).—From Natick (Algonk.) *koko-shki*, "it is very rough," a name referring to the hispid character of the stems, which has given the plant one of its popular names—that of the "rough-stemmed Aster." The name was applied also by the Indians (and is still applied) to *Erigeron Philadelphicus*, because of its rough, hairy stems.

COHOSH.—A name for several plants having similar medicinal properties—namely, *Cimicifuga*, *Caulophyllum* and *Actæa*. It is from *cohosoo*, meaning "it is spiny," or "bristly" or "rough to the touch," the Indian (North-

eastern Algonkin) designation, not of the plants, but of their medicinal rhizomes, which are of a more or less rough and jagged nature when dry.

COONTI.—A name usually appropriated to *Zamia integrifolia*, but a general term among the Seminoles for bread roots. There are several variants of the word, such as Coonta, Coontia and Koonitie. It is apparently from *kāna* (*kān* in composition), "ground," and *ata*, "under."

CUSCATOMINY, with variants: Cruskatominy, Kiskitomas, Kiskitomis, Kisky Thomas, Kiskytom and Kitkytom.—A name in the vicinity of New York city (Long Island and Staten Island) for the nut of *Hickoria ovata*. Dr. J. H. Trumbull conjectures that the name alludes to the thinness of the shell of the nut of the Shagbark Hickory, and that it implies one that may be "cracked with the teeth." If this is so, it is a corruption of a word that may be compared with Abnaki (Algonk.) *oosekooskadāmen* (contracted *skeoskadāmen*), "he crushes it with the teeth."

DAHON (*Ilex Cassine*)—a word first used by Catesby (1722-6). It has been supposed to be Indian, but it cannot now be referred to any language formerly spoken in the southern states.

DOCKMACKIE (*Viburnum acerifolium*).—A word of Mohegan (Algonk.) origin, meaning "it is cooling." "The oldest Dutch settlers in Columbia County, New York," says Eaton (*Manual of Botany*), "tell us that the Indians in that vicinity considered the external application of the leaves of the Dockmackie as a sovereign remedy in every kind of inflammatory tumor."

DOGACHAMUS, or **DOGACKERME** (*Cornus circinata*).—A corruption of Penobscot (Algonk.) *damaganatikwimosi*, "pipe-stem bush."

HACKMATACK (*Larix Americana*).—A corruption (an anagram, really) of *tacamahac*, an early name in Massachusetts for the same tree. The name has been transferred to several other conifers, such as *Thuya occidentalis*, *Pinus contorta*, *P. Murrayana*, and *Juniperus communis*.

HICKOK (*Chrysobalanus Icaco*).—Through Carib-Span., from *ikákoo*, the name of the plum-like fruit in the female dialect of the Caribs of the Lesser Antilles. Cocoa, in the name Cocoa-plum (Corker-plum in Florida), is a variant of the word.

HICKORY.—This word, or rather the word of which it is an abbreviation, was the name neither of a tree nor its fruit, but of an emulsion prepared by the Virginia Algonkins from the mocker-nut (*Hickoria alba*), and used as an ingredient in their cookery. Strachey (*Travels into Virginia*, p. 129), speaking of the "walnuts" of the country, says, after mentioning the black walnut and the butternut: "The third sort is . . . exceeding hard-shelled and hath a passing sweet karnell; this last kind the Indians beat into pieces with stones, and putting them, shells and all, into mortars, mingling water with them, with long wooden pestells pound them so long together untill they make a kind of mylke, or oylie liquor, which they call *poucohicora*." This word (properly, *pakohikoré*) means, literally, "it is brayed." As a name for the emulsion so called, it corresponds to the English expression "brayed-stuff," or "that which is made by braying." The word is from the root *pak*, "to strike," or "beat"; whence also the name Pecan, *q. v.* The changes which this word has undergone up to the present, starting with it as the name of a food preparation simply, are, chronologically, as follows: *pokahiquara*, *pokahichory*, *pokerchicory*, *pokikerrie*, *pockery*, *pohichery*, *peckikery*, *pieck-hickery*, *hickery*, *hiquery*, *hickory*, *hiccory*, *hickorie* and *hiccora*. The orthography now adopted was first used in 1682, in *An Account of the Province of Carolina* (reprinted in Force's Tracts).

The word hickory as a name, in what were formerly Spanish possessions, for a chocolate cup, is from Mex.-Span., *jicara* (formerly *xicara*), a chocolate cup, from *xicalli*, the Aztec name (1) for a small variety of gourd, and (2) for a roundish cup or bowl used for drinking purposes. Hickory, a name for several small species of *Mamillaria*, belongs to

the language of the Tarahumari Indians, who inhabit the Sierra Madre, near the frontiers of Mexico.

New York.

W. R. Gerard.

Mycology in the Southern States.

CONSIDERING the later development of botanical study in this country, it is not a little singular that the two earliest students of American fungi commenced their labors in a single state, and that that state was North Carolina. Schweinitz and Curtiss described their species largely from the south. Their species, like many others of that day, were very briefly described, and a very large number of them have never been seen since their original discovery; this arises from two conditions: (1) The inherent difficulty of identifying the plants from the descriptions, and even from the types, some of which are lost, and (2) the fact that very little field work has been done in the southern tier of states since their time.

If we should draw a line across the country along the northern boundary of North Carolina the area south of that line, made up of thirteen entire states and about two-fifths of California, will represent about one-third of the United States, exclusive of Alaska. Let us examine briefly into the field work in mycology that has been accomplished in this portion of our territory. Leaving North Carolina where the two pioneers labored, and South Carolina, which was later explored to a considerable extent by Ravenel, we come to Florida, which has been lightly skimmed by a few transient collectors, Dr. Martin, Calkins, Nash, the writer, and the two enthusiastic workers at the subtropical laboratory, but not a tithe of its riches has been brought to light and the region of its really tropical flora is even yet untouched. From Alabama the late Judge Peters and Beaumont both contributed somewhat to the Berkeley and Curtiss series, and later Professor Atkinson made considerable collections in the central eastern portion of the state during the short time he was connected with the Alabama Polytechnic Institute.

In Mississippi, Professors Tracy and Earle, in the moments stolen from professional work, have brought out a preliminary list of Mississippi fungi containing over 350 species, of which one-sixth were undescribed, and they have already a large supplementary list ready for publication. In Louisiana, Hale collected a few species in the early days, and more recently Father Langlois has done a highly creditable work in the collections he has made largely in a single parish. From the vast state of Texas what have we to represent its rich flora? (1) A list of 149 species by M. C. Cooke, collected by Lindheimer, Wright and Ravenel. (2) A partial bulletin from the experiment station devoted to parasitic fungi, and including a list of 95 species, many of which are included in the preceding. (3) A brief review of the fungous flora of the state by Ravenel, which incidentally mentions a few species. All and only this from a state that probably supports a larger fungous flora than any single state of the Union. In 1891 the writer spent a few hours in the city of Austin, and with a half hour to spare strolled out to one of the arroyos within the city limits. On this stroll, which was taken in a dry, unfavorable season, six species of fungi were gathered. Three were new to science, and three represented rare and highly interesting genera, two of which are unique and scarcely represented in any of the larger herbaria. The incident is unimportant in itself, except as it shows what quantities of material are in store for those who commence the exploration of this almost unknown territory.

Until the last three years southern California has been a terra incognita in mycology, but during that time Professor McClatchie has made a highly creditable commencement in the region about his institute.

From the remaining states in this southern tier, Georgia, Arkansas, Oklahoma, New Mexico and Arizona, no systematic field work has ever been done, and probably two hundred species would cover our knowledge of their aggre-

gate mycologic flora, the larger portion being collected by Professor Tracy on a single trip across the territories. Surely there is room for abundant field work throughout this entire third of our area. The exact knowledge of the higher plants is slender enough; any one who has spent even a little time in the area covered by Chapman's Flora is painfully aware of that, but in the field of cryptogamic botany the work has been much less thorough.

And to whom must we look for the exploration of this vast unknown? Naturally to the experiment stations scattered throughout this area, for they represent the leaders in scientific matters throughout this belt as in no other portion of the country. The other colleges, including some that are recognized as state institutions, are mostly strictly literary in their tendencies, and in many of them departments of science, particularly the newer biologic sciences, receive a little encouragement. Throughout this entire area there is scarcely a professor of botany outside of the experiment stations, and the private workers who are sufficiently interested in exploration to be of service can easily be counted on the fingers of a single hand.

There is need of just this sort of exploration, and there is need of it now, before more serious modifications of the original flora occur than civilization has already brought. Considerable is being done at some of the stations, but at others less, and at some nothing. A few have not even a botanist, much less a mycologist, on their staff. The work of investigation of plant diseases is proper, and must be carried on; the studies of ecology and physiology and pathology are opening up new fields of exploration, and must needs be attended to, but with all these varied interests there is great need that the cryptogamic flora of the southern third of the United States be brought to light.

While I make this plea for work in mycology, I do not forget that our knowledge of the Algæ of this region is vastly less than that of any other group, and even the Spermatophytes, too often studied from imperfect dried material, instead of in their native haunts, will follow closely on.

Auburn, Ala.

Lucien M. Underwood.

Foreign Correspondence.

London Letter.

WE in London are now in the height of the gardening season, and every one in the horticultural world seems to be working at high pressure. This is most evident at the periodical gatherings at the Royal Horticultural Society's headquarters. I thought on Tuesday last that I had rarely seen a more bewildering assemblage of novelties among all classes of plants than was shown there, and seldom has the hall been so full of plants, flowers and people. It was an eloquent sign of the healthy and active state of horticulture in this country at this time.

I cannot comment upon all the new and remarkable exhibits that interested me, but will pick out a few that the fraternity on your side might like to know about. Beginning with the Orchids, which, by unwritten etiquette, are presumed to hold the right of first mention, there was such an extraordinary display of these that not even at the Great Temple show was there such a gathering of the choicest and rarest kinds. I need only mention that the exhibitors included Baron Schröder, Sir Trevor Lawrence, Hon. Walter Rothschild, Sir F. Wigan, Messrs. Crawsboy, Ingram, Cobb and Gaskell among amateurs, and Messrs. Veitch, Sander, Low and Williams among nurserymen, and from this list orchidists may know that the choicest Orchid collections were represented. There were, however, comparatively few that obtained certificates or awards of merit. The only first-class certificate was given to a splendid form of *Miltonia* (*Odontoglossum*) *vexillaria*, called *Memoria G. D. Owen*, which has the large flowers of the finest forms with the color of the smaller autumn or late-flowering variety, and so peculiar were the markings that it brought out the general remark that it more resembled the expanded

wings of a gorgeous butterfly than any Orchid known. It is certainly the most lovely variety yet seen in this country. Among the many new *Cattleyas* and *Lælias*, one from Mr. Ingram, named *Lælio-Cattleya Pytho*, a cross between *L. elegans Turneri* and *Cattleya Loddigesii*, was thoroughly deserving of its award of merit. The flowers indicate intermediate characters, the sepals and petals being deep rose-pink, with the broad lip of a deep hue passing to white. Another *Lælio-Cattleya* is a variety of *Mardelli* from Messrs. Sander. It differs from the type by the lip being deeper and richer in color, and with a conspicuous lemon-yellow blotch in the throat. It is a cross between *L. elegans* and *C. Luddemanniana*, and, no doubt, is a seedling variation. A splendid variety of *Odontoglossum crispum*, named *Lord Sherborne*, won an award on account of its distinct color, which is white, flushed with rose, and heavily blotched with reddish brown. These were all that the committee distinguished by awards, but among the collections there were some Orchids in superb condition, the names of some of which will be sufficient for specialists who might like to know whose they are. Baron Schröder had the gorgeous *Lælia-Cattleya eximia*, with four flowers, perhaps the largest of all *Cattleyas*, and extremely rich in color; *L.-Cattleya Canthauriana*; *Cypripedium platytænum*, still among the rarest of Orchids; *Sobralia xantholeuca*; *S. macrantha Kienastiana*, with gigantic flowers, and fine examples of the rarely seen, but old, *Lælia majalis*. Sir Trevor Lawrence's collection was chiefly of rare botanical Orchids, as they are called—that is, they are not showy. Mr. Rothschild had in his lot a new *Catasetum*, named *splendens leucanthum*, a natural hybrid, recalling in size and form *C. Bonigerothi*, the flowers of ivory-white, of thick texture and adorned with emerald-green blotches at the base of the petals. Messrs. Veitch had several of their finest hybrids, and among them the new *Disa Langleyensis* and *D. Kewensis*, raised at Kew, both first-rate and decidedly coming Orchids. One of the finest things in Messrs. Sanders' group was *Sobralia Amesiana*, with beautifully formed flowers of a delicate white, suffused with rose-pink. There were many varieties of *Cattleya Mossiæ*, as this is just the season for them; although there are countless varieties, those shown named Mrs. Egerton Grey and E. Ashworth, both from amateurs, are worth noting.

Among the collections of other plants the *Cannas* were remarkable, being the finest I had ever seen, especially those from Messrs. Cannell, of Swanley. There were many novelties, but the committee are evidently very careful in giving certificates and awards. Among all the lot but two received awards of merit. One of these, from Messrs. Veitch, was called *Austria*, a variety with one of the largest flowers I have seen, and of a rich warm yellow, with only faint freckles of red, the best yellow yet seen here. The other award was to Messrs. Paul for one called *George Paul*, very large and of good shape, with rich orange-scarlet spike, massive, the foliage bronzy red. Some of Messrs. Cannell's new sorts I thought were exceptionally good, especially those named *Paul Meylan*, deep orange-red; *Golden Queen*, a fine yellow; *Pierson*, intense crimson; *M. H. Debrouse*, yellow, spotted with scarlet; *Avilan*, a finely formed flower, yellow, spotted with crimson, and *Senateur Montefiore*, orange-scarlet, blotched with red. Veitch's collection included such fine varieties as *Alphonse Bouvier*, *Comte de Bouchard*, *L. E. Bailey* and *Progression*. The best in Messrs. Pauls' lot were *Czar Alexander III.* and *J. G. Baker*, both first-rate. The collection included new *Cannas* from a large number of cultivators, but there was no great advance shown over the exhibits of previous seasons. It seems as if growers of new *Cannas* need some new raw material to work upon so as to obtain a new break in color.

Roses were plentiful and in perfection. Among a few new varieties, one of the most remarkable was a white form of *Rosa rugosa* with fringed petals, named *fimbriata*. It is decidedly distinct and pretty. It is in flower at Kew,

where it is pure white and strongly perfumed, but at the show the flowers were blush white. Another variety that won an award was *R. rugosa* Rose Apples, which is semi-double and pale pink, very floriferous and quite distinct as a garden Rose. Messrs. Paul had also a new single Rose in the way of Carmine Pillar. It is of an intensely brilliant scarlet, large and abundant, and will make a showy Rose for the garden. It is named Royal Scarlet. The hybrid Briers raised by Lord Penzance were shown beautifully by Cooling, of Bath. There are many varieties now, but several are too much alike. The four which I consider represent all the characters in these hybrids are all beautiful.

awards of merit to them, notwithstanding that there is now such a multitude of first-rate sorts. All the sorts were what are here called border kinds, in distinction to the tree kinds which flower in winter and are grown under glass. The best yellow I have seen was *Admiration*, shown from Blenheim by the Duke of Marlborough. It has flowers as large as a *Malmaison*, very full and of a clear yellow like *Penshurst*. Mr. Martin Smith, now the most prominent amateur Carnation fancier, obtained awards for *Nabob*, of a rich terra cotta like *Reynolds Hole*, but a larger and bolder flower, and *Her Grace*, with large flowers of a delicate pink that do not burst the calyx.



Fig. 37.—An Algerian Yew-tree (*Taxus baccata*).—See page 261.

These are *Amy Robsart*, *Rose Bardwardine*, *Anne of Gierstein* and *Lady Penzance*. They range in color from an orange-red to a rich crimson-rose and are all extremely floriferous and with strong perfume. Some masses of them now in full beauty at Kew on the lawns are the attraction of crowds of visitors, and that fact is a good criterion of the value of a garden plant.

Carnations were shown in large numbers, and rarely has there been at one show such a gathering of new sorts. Half a dozen were considered so good and distinct by the committee that they could not do otherwise than give

The well-known raiser Mr. Turner, of Slough, had a large and fine collection and won awards with *Delos*, brilliant scarlet with a rich Clove scent; *Virgo*, a yellow ground flaked and margined with scarlet, and *Ness*, best described as a scarlet Clove. Several others could have been picked out of this collection as good as those certificated, such as *Loveliness*, pale pink; *Corunna*, yellow ground; *Lady Biddulph*, a fine *Malmaison* type, and *Little John*, vivid scarlet. These are all worth including in the choicest selections.

The *Delphiniums*, from Mr. Kelway, of Longport, now

the most noted raiser of these valuable border flowers, had an extensive display of superb varieties, the majority seedlings. But it is difficult to describe them as they differed only by subtle shades of purples and lilacs. One I singled out as very remarkable, and, in fact, is the only variety I have yet seen with ivory-white flowers, and is a decided break from the prevailing tints. It may lead up to some remarkable seedlings with variegated flowers.

The Chrysanthemum-flowered Pæonies from Messrs. Wallace, of Colchester, attracted much attention, as they are distinctly different from the full double sorts. Mr. Wallace told me he imported them direct from Japan, where they have evidently made a point in selecting this peculiar type of flower. The flowers are large, with broad shell-like outer petals, while the inner petals are narrow and incurved like a chrysanthemum, or rather like an anemone. One can see a future for this type of Pæony, though perhaps they will never rival the glorious French varieties with huge globular double heads.

The most remarkable cultural exhibit in the show was a collection of *Streptocarpus* grown to perfection by one of the best vegetable gardeners in the country. The plants represented all the finest of the Kew and Chelsea hybrids, and every plant carried quite a sheaf of several scores of blossoms. They were quite a revelation to most people, and especially to the men who raised the hybrids, as they never thought that such perfection could be attained in such plants. The collection was the greatest advertisement Messrs. Veitch could have for their hybrids, and, no doubt, it will give an impetus to *Streptocarpus* culture. Of the miscellaneous exhibits may be mentioned the pretty Californian *Brodiaea Howelli* lilacina, which was considered worthy of a first-class certificate. It is much richer in color than the type, and the same exhibitors, Messrs. Wallace, also showed *B. ixioides erecta*, distinct from the type in its larger flowers and more erect umbels. They also had a number of lovely Californian bulbous plants, *Calochorti* and the like, besides Japanese Lilies, of which the new form of *L. Japonicum*, called *Alexandra*, was remarkable. It may be best described as a pure white *Lilium Krameri*. Messrs. Veitch showed some choice Japanese shrubs in flower, including *Cornus Kousa*, *Styrax Japonica*, *Indigofera decora alba*, and *Cæsalpinia Japonica*, all of which have proved hardy in their nursery in Surrey, though all regarded as doubtful plants generally in this country.

Kew.

William Goldring.

Cultural Department.

Filmy Ferns in the Dwelling-house.

IT may seem strange to some to be told that Filmy Ferns are good house plants, as their fronds are of the thinnest possible texture and they require to be continually kept in a very humid atmosphere, but they can be grown successfully by keeping them all the time in a glass case. An inexpensive case can easily be constructed with three large panes of glass for the top and for the two sides, and two smaller ones for the ends. The size of the panes can be determined by convenience and the kinds of Ferns it is intended to grow. The bottom of the case should consist of a stout piece of wood, and on top of this a zinc pan to prevent water getting through, and also to provide a constant supply of moisture. The glass can be kept in position with four pieces of oak-wood with the bark on and a quarter section grooved out the entire length. The pieces can be nailed to the wooden frame, and at the top fastened with wire or pieces of wood running all the way round, finished off so that the glass top will lie perfectly flat. The kind of soil in which I find Filmy Ferns to succeed best consists of rough peat or fern-roots, pieces of broken pots, bricks or sandstone in equal proportions. Some rough sand should be added, and lumps of charcoal the size of small Hickory nuts, all mixed together thoroughly. Some rough gravel should first be put into the zinc pan and this covered with some that is a little finer. Instead of planting the Ferns out in the case I prefer to keep them in pots or small seed pans, and success depends greatly on the manner in which they are potted. One-third of the pot should be filled with small pieces of

broken pots for drainage, and the remainder filled with a sufficient quantity of the soil to keep the plant when finished off well above the rim. The soil should be firmly pressed about the roots and pieces of charcoal or sandstone be used to keep it firmly in place. When placed in the case the spaces around the pots should be filled in with different kinds of rocks. The tallest plants should be in the centre, or if the plants are all about the same size some should be stood on pieces of flat stones. The rocks will soon become moss-grown and present a beautiful appearance. After the Ferns are potted and arranged the first watering should be done with a fine sprinkler so as to settle the soil; after that they must be watered through the spout of a small watering-pot, as the fronds should not be watered overhead. If water is kept in the zinc pan all the time it will be found that the plants will require but very little water. A window facing north is the best position for them, and if put in a more sunny place they must be shaded. In fact, the sun should never be allowed to shine on them as it dries up the moisture which condenses on the fronds much too rapidly.

In the selection of kinds to be cultivated there are a great many to choose from. The greater number are only of botanical interest, but there are several ornamental-leaved species suitable for this purpose. One of the best is *Trichomanes reniforme*, a native of New Zealand, with almost transparent, kidney-shaped leaves. The variety of the Killarney Fern, *T. radicans*, which grows wild in some parts of Alabama and adjoining states and is named *Alabamensis*, is well adapted for this work, as it is dwarf and grows very easily. *T. trichodeum* is well worth trying; the divisions of the fronds are almost hair-like, presenting a beautiful appearance when well grown. Small plants of *Todea superba* have a very ornamental appearance; they can be kept for some time in a small state if given only limited root room; otherwise they soon become too large for a glass case. Among the *Hymenophyllums*, *H. demissum*, *H. hirtellum* and *H. pulcherrimum* all thrive under ordinary conditions.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Notes on Hardy Perennials.

DICTAMNUS ALBUS, oftener found in gardens under the name *D. Fraxinella*, is an extremely effective plant when well grown. We find the form with rosy or purplish flowers more robust, and it makes much larger and more effective plants here than that with white flowers. This perennial plant has been cultivated in gardens for a great many years, and few perennials have a better and more effective habit. It has stout stems standing erect without staking, and attains a height of two feet and sometimes more with good cultivation. It has very distinct shining pinnate leaves. The flowers are produced in erect terminal racemes, and they last for two or three weeks in good condition. It does best here in a deep, partially moist soil and in a position where it is shaded from the sun during the hottest part of the day. We find that it thrives best if not disturbed too often.

Along the back row of the herbaceous border large plants of *Clematis recta* are in full bloom and are imposing at this time. This hardy perennial *Clematis* is an ideal plant for such a position, but requires careful tying to a strong stake about four feet in length. If this is neglected the showy white corymbs are not seen to advantage at flowering time. There are several forms of this plant, some of them blossoming a week or sometimes nearly two weeks before the others open their flowers. The typical plant is from four to five feet high and well clothed with pinnate leaves, the leaflets stalked, ovate, acuminate and entire. The flowers in many of the forms are produced in dense corymbs, although some have loose corymbs and are less valuable as decorative plants. One distinct variety now in flower makes a neat border plant attaining a height of from two to three feet, and it has loose corymbs of white flowers. This plant is known as *C. recta lathryfolia*. *C. integrifolia* is a neat distinct border plant with stems two feet high and stands erect without any support. The leaves are entire, rather scattered on the stems, ovate-lanceolate and smooth. The nodding blue flowers are produced singly on rather long peduncles at the ends of the stems. Although it is not as showy as some plants belonging to this genus, it has its own place and works in nicely in the third row from the front in the border.

A plant that attracts a good deal of attention in the border is *Gypsophila Gmelinii*. This Siberian plant has an elegant habit; it is about eighteen inches high and spreads out a yard or more in diameter. The loose, spreading stems are produced from a half-woody root and form a round, compact

plant. The innumerable white flowers are produced in loose airy panicles. *G. paniculata* is a handsome plant, but this *Gypsophila* has a better habit and has larger and more showy flowers. Its long roots penetrate deep, and it needs a deep light soil and an open sunny position in the border, or an exposed position in the rock garden. *G. Stevenii* is another plant with a light and graceful habit. It is about a foot and a half high and has panicles of small white flowers at this time.

Phlox ovata of Linnæus and *P. Carolina* are now both classed under the name *P. ovata*. They are excellent garden plants and distinct enough, especially for garden purposes, to retain their specific names. *P. ovata* is a neat showy plant with erect stems not much more than a foot high, and terminated with crowded, showy, reddish purple flowers. Its radical leaves are ovate, acute, rather fleshy, and the cauline ones are ovate-oblong. This plant blossoms here from two to three weeks earlier than the plant we used to know as *P. Carolina*. The *Phlox* formerly known as *P. Carolina* is just beginning to open its flowers. It is quite a distinct plant, growing several inches taller than *P. ovata*, and has longer and more tapering leaves and light purple flowers. Both kinds are easily grown in a light rich soil and a sunny position, where they increase rapidly. A collection of hardy plants is not complete without both forms of this plant.

Lindelofia spectabilis is a neat compact Boraginaceous plant. It is about eighteen inches high and has oblong-acuminate leaves, and at this time rather showy racemes of sky-blue flowers. It grows in a sunny position, and in light sandy soil. It is easily raised from seed and blossoms the second year.

A plant that makes a good companion for *Clematis recta* in the back row in the border and that blossoms at the same time is *Phlomis tuberosa*. This noble labiate plant is very showy when properly grown and well placed. It is tall-growing, with stout, leafy, erect stems, which attain a height of five feet, and it needs no stake. The purple-rose flowers are borne plentifully in dense whorls along the upper part of the stems. It is quite hardy and produces an abundance of seeds annually, from which plants are easily raised.

Linum flavum makes a neat border-plant and grows well in the rock garden, where it makes a yellow mass of color at this time. It has slightly woody stems at the base, which are about one foot long and are nicely clothed with narrow lanceolate-acute sessile leaves. The showy yellow flowers are in corymbs and are most bright on sunny days. Near the front of the border it makes a welcome color at this time.

In a slightly raised and sunny position in the rock garden a large bed of the double form of *Lychnis viscaria*, with bright red flowers, is now conspicuous. This plant is useful and attractive also near the front of the border, where its bright flowers can be seen from a distance. The erect stems of the well-known *L. Chalcedonica* are now crowned with dense clusters of scarlet flowers, which are prominent among other flowers. There are several good varieties of this plant, one with white flowers; but the form with double scarlet flowers makes a handsome perennial.

Thermopsis Caroliniana has blossomed well in the border this season. It is effective placed at intervals in the back row of the border. Its habit is good, and if not crowded too much by other plants it will make strong stout stems that need no staking. The stems grow four feet high and are terminated by dense erect racemes of showy yellow flowers a foot in length. A deep and partially moist soil suits it well, and it makes stronger stems if it is not shaded by trees.

Botanic Garden, Harvard University.

Robert Cameron.

Rhododendrons at Wellesley.

IT is only during recent years that the *Rhododendron* has taken its proper rank in the garden. As an evergreen flowering shrub it has few equals. For planting along avenues, for belting trees, for massing or for forming a single specimen on the lawn it is especially appropriate. Its bold rounded corymbs of broadly campanulate or rotate flowers, surrounded by an involucre-like whorl of handsome leaves, are borne in the greatest profusion wherever the plants succeed. During the last few years the number of available varieties and range of coloring has been constantly extended.

In the cultivation of *Rhododendrons* the location and the composition of the soil are matters of considerable importance. It is a mistake to suppose a sheltered southern aspect is absolutely necessary, and the reverse is nearer the truth, as even a slight experience will show. Many years ago Mr. H. H. Hunnewell enclosed a portion of his garden, planting dense hedges of Spruce-trees as a shelter from northerly winds and to protect

the choice tender varieties, especially those brightly colored kinds in which there is a considerable infusion of the Himalayan *R. arboreum*. After many failures, he at last found that such varieties as he expected to grow there did better in more exposed places, screened to some extent by belts of trees or taller varieties of hardier *Rhododendrons*.

The composition of the soil is also important. A cool, moist subsoil should be secured wherever this is possible. A good peaty, though porous, loam, with a fair admixture of leaf-soil, may be recommended as best, and this should, at least, be four feet deep; would be even better deeper. This, however, must be largely a matter of experience. *Rhododendrons* may, and often do, succeed well in good common loam and leaf-soil, providing they are well watered and mulched during the summer. For mulching, a good coating of well-decayed cow-manure will answer well. A heavy clayey loam, in which the natural drainage is poor, appears to be the worst of all soils for these plants. Moisture at the roots is absolutely essential during summer, and in dry spells of weather it must be artificially applied. Any evidence of suffering may not be seen at once. The roots penetrate far below the frost-line, and if when winter comes they lack the proper supply of moisture, the damage resulting will be seen before spring in injured foliage and dead flower-buds which have failed to properly ripen in the autumn. It is only by close study that these facts are discovered. An ordinary observer would be sure to assign the cause to the severity of the winter. By carefully examining the weather records in regard to this matter, Mr. Hunnewell has always found that *Rhododendrons* suffer most after a very dry summer and autumn. On the approach of winter a covering of Oak-leaves about a foot in depth will afford protection to the roots, equalizing the thermal conditions of the soil throughout the winter; and these leaves when decayed fertilize the soil. If there is objection to the unsightly appearance of the leaves during summer, a covering of pine-needles will smooth over the surface. Lacking these, sweepings of short grass from the lawn will answer the same purpose.

It is upward of forty years since Mr. Hunnewell began a collection of *Rhododendrons*. At that time only seedlings were imported, and it was not thought possible to grow any of the choicer named varieties in this country, especially in the New England states. Some of these seedlings to-day are noble plants, upward of fifteen feet in height and as much in diameter. *R. Everestianum* was one of the first really good varieties to prove thoroughly hardy. With good cultivation the plants increased in size and beauty, and there was a desire for more variety of coloring, especially an admixture of scarlet shades. These could not be obtained without some degree of infusion with the *R. arboreum* type. In his endeavor to acclimatize the beautiful large flowers, common in Europe, Mr. Hunnewell had the coöperation of the noted English specialist, Mr. Anthony Waterer, who has made a particular study of raising varieties for the New England climate. *R. Ponticum*, which is tender here, but hardy in Europe, had hitherto been used as a stock for these hybrids, in most cases entering into their parentage also, and this is why so many plants imported years ago did not stand well. Mr. A. Waterer substituted our native *R. Catawbiense* from the hill regions of the south, as that is hardy in New England. It does not appear that our northern *R. maximum* has been used to any extent, though, no doubt, it is just as well suited for this purpose. It is a late bloomer. With only partial success at first, and with failures enough to discourage all but the most persevering, the work of acclimatization has been continued until now a score or more of the choicest and best *Rhododendrons* once thought tender here have proved themselves hardy. All hybrids in which the Himalayan type is well marked may be set down as unrelatively hardy. The narrow, sharply tapering foliage is a sure indication that the weight of parentage lies with the more tender kind. There are many fine plants of this class, healthy in every way, which are uncertain bloomers, and only a few trusses open, often with but few flowers. But it does not count much with a true lover of these grand plants if a few do not bloom every year. Many kinds bloom too much, and it is surprising that they can continue to do so.

Recent experience has again shown that the loss of flower-buds may not be altogether due to extreme cold, for on plants of some tender varieties, lifted and stored in well-protected cellars, the buds remained apparently intact, but the flowers within the sheaths were killed. Perhaps the buds were not thoroughly ripened, or even advanced too much, flushed by autumn rains and bright days. I merely suggest this question for consideration, as it is only on the leading and most vigor-

ous shoots that the buds are injured, and always quite as much so on the healthiest plants. Occasionally, when all the upper buds are flowerless the weaker side branches will bear fully developed flowers.

The successful acclimatization of so many doubtful varieties, embracing new, rich and distinct colors, has been surprising. But it has not been done without attention to the minutest details and a regular system of records. The frequent removal of a variety from one place or position of exposure to another has been necessary to ensure a thorough test, and this has been done when less interested cultivators would have consigned the variety under test to the rubbish heap. Often it has been a question of kill or cure, and then the most unsightly plants have been removed to a swamp as a last recourse. This swamp is a low piece of ground, near the water-level, altogether composed of peaty soil, and is occasionally flooded. Nevertheless, it has become a recruiting ground, and from the road there is quite a show of bloom. This is remarkable when it is remembered that all the plants, when removed here, were considered almost beyond recovery. In this connection it is worthy of note that our locally native species, *R. maximum*, grows naturally in swampy places, and when planting on higher ground, good deep soil and plenty of water must be provided for it. The remarkable success achieved here has been due almost entirely to close attention to these details.

Distinctly spotted varieties of lighter shades are still lacking. A recent importation for trial includes some of this character, which it is hoped will prove hardy. Some of these have the broader, rounder leaf, the almost certain criterion of hardiness, while others have narrower leaves, and can almost at once be set down as doubtfully hardy.

Hybrids in which the blood of our native *Rhododendron Catawbiense* prevails are the hardiest in constitution, and from these some of the hardiest and best rose and scarlet shades are derived. The following varieties have been thoroughly tested, and have proved entirely hardy: *Album grandiflorum* is an old variety, and there are many large plants here; in point of beauty its magnificent trusses of pink flowers, changing to white, are scarcely exceeded by any of the newer kinds. *Lady Grey Egerton*, silvery blush, with grayish brown spots, is strikingly effective. *Charles Bagley* is cherry-red, with a fine truss and foliage. *Caractacus* is deep crimson, and everywhere recommended. *Lady Crossly*, salmon-pink, with broadly campanulate flowers, is represented by some fine plants. *Lady Armstrong*, seen in many places, was once thought tender, but is now regarded one of the best hardy varieties, handsome in foliage as well as truss; the flowers are rosy red and much spotted. *Charles Dickens* seems to me the most striking of all the red *Rhododendrons*. *Sefton* is another grand variety which has only within the last few years proved hardy; it is deep maroon, with a large truss, large flowers and handsome foliage. *Kettledrum* is hardy and distinct, rose-colored. Other proved sorts are *Old Port*, plum color; *Alexander Dancer*, beautiful warm red, and one of the earliest and best; *John Waterer*, free, dark crimson; *Maximum Wellesianum*, blush, changing to white; *Delicatissimum*, also blush, changing to white, and late, the handsomest of all for individual specimens—it is fully a week later, blooming with the *Mountain Laurel*, *Kalmia latifolia*, and it is largely associated with them for effect; *Mrs. Milner*, rich crimson.

Some varieties not yet in the market are here for trial. They are in all respects the best in their line of color yet sent out. *H. S. Hunnewell* is white, with brown spots, compact and free. *F. L. Ames* is of the best type, and one which must become the ideal; the individual flowers are very large, round and smooth, with a white centre and pink edge; it is free from the fringe characteristic of many of the older varieties. *Charles S. Sargent* is a red rose-flowered kind, with a compact truss and good habit. *Mrs. C. S. Sargent* is said to be the pink *Everestianum*; it resembles the older variety in some respects, but the flowers are larger.

Under canvas there is an exhibition at Wellesley of distinctly tender varieties, all of which are removed to cellars in winter. These additional three hundred or more varieties embrace the most beautiful colors known among these plants, but it is hardly probable they will come into general cultivation, on account of the special conditions required. *Princess Mary of Cambridge* is a beautiful blush with a deeper edge; out-of-doors this variety has stood the winter well, and, though some buds were killed, it still shows a few perfect flowers. *Kate Alice Waterer* has fine trusses of erect flowers, rosy edged, with a white centre, upper petals blotched with brown. Other tender varieties are *Mirandum*, red-rose, beautiful truss; *Mrs. Shuttleworth*, scarlet, light centre, much spotted—a distinctly beautiful variety; *Mrs. Simpson*, white, beautifully spotted;

John Walter, rich crimson; *Ralph Saunders*, deep crimson, finely marked; *Mrs. John Clutton*, almost pure white. This partial list can give only an inadequate idea of this rich collection, and all who can make it convenient should visit Wellesley during the flowering season, when Mr. Hunnewell opens his grounds to the public.

Wellesley, Mass.

T. D. Hatfield.

Correspondence.

Native Plants at Niagara Falls.

To the Editor of GARDEN AND FOREST:

Sir,—Nature never fails to give us her overtones when she plays her great symphonies, any more than do the great composers. We cannot fail to catch the softening and mellowing thus lent to the musical strain, for hearing is involuntary, but we must so often be taught to see what is right before us, and our teachers are so few, that we not infrequently miss all but the most dazzling part of the outdoor picture. The devotee of field science is never more aware of this than on visiting Niagara Falls. Standing a fortnight ago on Prospect Point, perhaps the most striking scenic spot in the world, I leaned over the edge of the sheer and partly overhanging wall and looked down, not at the great sheet of water, but at the rocks that continue the gorge northward.

There is often scarcely a handful of soil to the square foot, and sometimes apparently none at all on the face of the great precipice, yet it is clothed with wild plants almost from top to bottom. So hidden are they by the perpendicular wall and the artificial coping above it that many of them are hard to make out, but new discoveries are made at every change of position. The *Columbine*, *Aquilegia Canadensis*, loves the spot so well that its bright red blossoms appear sometimes after they have disappeared from gardens. The plant is the most venturesome and hardy of any there, and appears in a rock crevice where nothing else but the bare wall is seen. It is difficult to understand how it subsists or even clings to the wall, but it is content and holds out no hands for sustenance except to the humid air. One or two wild *Roses* are there, and the Wild Gooseberry sends up sturdy stems near the top of the wall. A *Spiraea*, probably *tomentosa*, is at home, and *Golden-rods*, *Rhus toxicodendron* and probably *Rhus radicans*, as it is everywhere about the Falls, and *Ampelopsis quinquefolia*. Creepers are rampant, hardly less so than in the woods on Goat Island, where the wild Grape attains great size and runs freely over the tops of quite tall trees. The wild Grape on the edge of the gorge was just setting its crop and showed a luxuriance of bunches that would charm a vineyardist. Bittersweet and *Solanum Dulcamara* are also there. These vines do not venture far down the wall, as they need soil, but they are in the spirit of the place and are seen rising from its base and sometimes making their way far up the moist surface, while the *Aquilegia* and some smaller greenery, that it is hard to make out in the distance, crop out of every seam and ridge and terrace from base to summit.

It is this acceptance of the wild spirit of Niagara that makes its flora so acceptable. The soil is naturally thin and sterile, so that the effort to turn the river bank on the mainland into a cultivated park is so far indifferently successful, and the ambitious evergreens that were planted on Bath Island are all gone. But this makes no difference with the wild plants; they flourish everywhere and are as indifferent to the soil as any but actual air-plants can be.

The wildest of our native plants do not yield naturally to cultivation, because they demand atmospheric conditions that cannot be transplanted with them. The result is that they linger awhile out of their native element and then disappear. Let Niagara pretty generally alone and it will never want for flora that is appropriate to it. There is very doubtful need of the forest-tree nursery that is made to disfigure a part of Goat Island, or the thicket of Snowberry, *Symphoricarpos racemosus*, that begins to shut in the drive from Bath Island.

Buffalo, N. Y.

John Chamberlin.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—Last June I planted an innocent-looking little tuber of *Thladiantha dubia* in a bed of choice bulbs, and soon had a large vine, with scabrous heart-shaped leaves and yellow flowers about as pretty, though not as large, as those of a Pumpkin. It wandered all over the bed, hiding and choking finer plants, and had to be confined to the margin by pegging down. As it did not commend itself to me as worth saving, I

did not take it up in the fall, and supposed I had seen the last of it, but this spring it appeared again in twenty different places, persistent of life, hard to exterminate, and destroying better plants. Among choice exotics it is a pest, as it will soon overrun everything else. For a quick-growing screen, trained over a trellis, it may be useful, but there are many things that are prettier for such a position. *T. dubia* is a perennial of the Gourd family, and its home is north China and India.

In a large collection of *Spiræas* flowers can generally be found from the first balmy days of April until the sharp frosts of late autumn. In our collection several species and varieties are now in flower. One of these is *S. Billardii*, which is not a favorite with us because the panicles of bloom, bright pink at first, fade to an ugly brown and give the bush an untidy appearance. It is a *Spiræa* of rapid growth and large size, and remains in bloom a long time. The fresh flowers are pretty for vases, mixed with the white bloom of *S. sorbifolia*, which is now waving its graceful plumes in one of the lower shrubberies. *S. sorbifolia* is another rapid grower, and it spreads inconveniently by many suckers, encroaching on its neighbors and robbing them of light and air. A handsomer variety, *S. Lindleyana*, does not thrive with us, as our summers are too hot and dry for it. It needs much moisture, and should be grown on the margin of a stream or pond. *S. Lindleyana* has never bloomed for us, and in times of drought it dwindles and shrivels up, sometimes withering to the root, and yet retaining vitality enough to sprout out again in the following spring. Another *Spiræa* now in bloom is labeled *S. Blumei*, and has blossoms that are somewhat similar to those of *S. Billardii*, though the panicles are not so long nor so stiff and upright in appearance. It lacks also the very long stamens that characterize *S. Billardii*. The *Spiræa* Anthony Waterer has begun to flower, and is the most beautiful of the smaller shrubby *Spiræas*. We have planted at its base a large clump of *Plumbago Larpentæ*, not yet in bloom. Late last summer, when the two were in flower together, the effect of the rich blue of the one and the deep carmine of the other was exceedingly pretty. *S. callosa Fortunei superba* is still in beautiful bloom, and it seems to me as fine in its way as the new Anthony Waterer, and is of much stronger growth. The color of the flowers is a rich deep carmine. Sprays of the two varieties are so similar in tint that it is hard to tell them apart. Anthony Waterer, however, has the great merit of blooming until cut down by frosts, while Fortune's *Spiræa* will soon be out of bloom.

The Purple Fringe is showy now. The fringe is a soft mist of color in which gray, green, yellow and pinkish tints seem to mingle, but I do not see any trace of purple as yet. It is most beautiful when, after a shower, it retains the drops of rain in its intricate meshes, looking like some fine embroidery sprinkled with tiny diamonds.

An interesting shrub now in bloom is *Zizyphus vulgaris*. This has handsome foliage with small varnished oval leaves and green inconspicuous flowers, which are succeeded by bright red berries. From the berries is made the jujube paste of commerce. Our single specimen of this shrub grows very slowly, and has never matured its fruit. It is in a part of the grounds where it receives a natural protection of Oak-leaves every fall, and it has survived several very cold winters. In Washington it grows to a large size.

A beautiful white Jessamine planted near it is protected in the same manner, and has lived out-of-doors for many years, though it has not reached a large size. It is blooming now and is dainty and delightfully fragrant.

We use Hollyhocks in front of the carriage-house and other outbuildings as well as in the wilder parts of the grounds, and they are now very showy. A rich carmine-colored single Hollyhock combines well with some pure white ones, and makes a fine display. In one place these plants are arranged in a scale of color from white through blush, pink and crimson shades to darkest maroon. The handsomest group of all, however, is one which arranged itself. Seedlings sprang up about an old clump and were allowed to remain as they grew. In this group the colors blend harmoniously, and the effect is at the same time gay and stately.

The Japanese Privet is now in bloom, and its flower clusters are almost as handsome as white lilacs. It flowers more profusely than any other Privet in our shrubberies, and the spreading growth of the shrub and its handsome foliage, which is not quite so dark as that of the Californian variety, make it a desirable shrub. I always find the bees busy about these Privet flowers. Lime or Linden trees are also favorite marts for honeybees. You can tell when the Linden blooms by the ear as well as by the eye. These flowers are pretty for table decoration. They are not very showy, but are cool-looking and fra-

grant, and a bunch of their drooping sprays on the lunch-table in a pale blue bowl has been much admired.

Shepherdstown, W. Va.

Danske Dandridge.

The Winter-killing of Plants.

To the Editor of GARDEN AND FOREST:

Sir,—Having noted with interest the accounts in GARDEN AND FOREST of the varying degrees of injury to shrubs and trees in different localities, caused by the severity or peculiarity of the past winter, I note a few incidents which have been observed at Fresh Pond, Cambridge, Massachusetts.

The plants were all young, having been planted on the grounds during the previous spring, mostly in nursery-rows, and were naturally more delicate than established plants. They had all made a healthy and vigorous growth the previous season. The heavy rains in the fall left the ground thoroughly saturated for the winter, and on the low places, where the moisture was in excess, the effect was disastrous to hardy and tender plants alike.

The only plant that suffered total destruction, whether on low or on elevated land, was *Ligustrum Ibo*, which was killed to the ground. Only a very few plants have made any growth from the bottom, and these but a weak start. *Ptelea trifoliata* was killed back in varying degrees, and in some cases the entire plant was lost. *Lonicera brachypoda*, which I had supposed would make growth from the root, was entirely killed back, and only about fifty per cent. have made a start from the root this season. Of *Magnolia acuminata* about fifty per cent. were killed to the ground.

Liquidambar styraciflua suffered little injury, as did *Gymnocladus Canadensis*. Of the plants collected and planted out in the fall the main loss was from decay of the root, probably caused by being too wet and heaving in the early winter, thus exposing the roots and freezing them out. Spring planting of such small collected plants seems preferable, or that well-drained land be selected for fall planting.

Mount Auburn, Mass.

M. A. Carpenter.

The Larch Sack-bearer and a Birch Pest.

To the Editor of GARDEN AND FOREST:

Sir,—The note by Mr. J. D. W. French in a recent issue of GARDEN AND FOREST (page 229) regarding the presence of the Larch sack-bearer, *Coleophora laricella*, in the vicinity of Boston, may be supplemented by the statement that it has been known for a good many years at the Arnold Arboretum, and its presence here was incidentally referred to in GARDEN AND FOREST, vol. v., page 87.

Some of the foreign Birches in the Arboretum and other localities about Boston have been killed by the attacks of boring larvæ of a beetle belonging to the genus *Agrilus*, and probably an introduction from Europe. The insect bores into the trunk and limbs, ultimately killing the tree. Its presence is often indicated by slight swellings of the bark. Badly infested trees should be cut down and burned before the beetles emerge in early summer, and an application of dendrolene on the bark would prevent oviposition, although, for a time at least, destroying the beauty of the white trunks.

Arnold Arboretum, Jamaica Plain, Mass.

J. G. Jack.

Recent Publications.

Greenhouse and Stove Plants. By Thomas Baines. London: John Murray.

This is one of those publications which are always useful in the gardener's library. It begins with a brief treatise on the different groups of plants which are grown in the greenhouse, intermediate house and stove, and the general treatment of Palms, Ferns and Lycopodiums. The great part of the book, however, is taken up with an alphabetical list of the different genera of plants in cultivation under glass, in which the various species are described as to their general character and appearance without going into botanical minutiae. The comparative beauty and value of each are estimated as near as may be, the uses to which it is best adapted, with a rather full discussion of the best methods of propagating and cultivating. There are numerous full-page illustrations, which have been carefully prepared, and a good index makes the contents of the book readily available. The old methods of attacking the ordinary insects are given, but some of the newer devices which are used

against these pests in American greenhouses are not mentioned. The various fungous diseases to which plants under glass are subjected are hardly alluded to, and the book seems to have been prepared before the modern methods of preventing rust and other contagious diseases were discovered. It is a large octavo of 361 pages.

Notes.

A summer meeting of the Nebraska State Horticultural Society at York, Nebraska, is announced for July 22d and 23d.

During the week ending June 24th there arrived at this port 22,200 boxes of Sicily oranges and 125,750 boxes of Sicily lemons. In the same term of 1895 the receipts were 13,500 boxes of Mediterranean oranges and 64,350 boxes of lemons.

The latest parts of Engler & Prantl's *Die Naturalischen Pflanzenfamilien*, Numbers 131-135, inclusive, which have reached us, are devoted to the Rutaceæ, Simarubaceæ and Burseraceæ, elaborated by Engler; Meliaceæ, by Harms, and a continuation of the Labiatæ, by Brequet.

Professor W. H. Jordan has been elected Director of the New York Experiment Station at Geneva, and will be succeeded in the Maine State College and Experiment Station, at Orono, by Professor Charles D. Woods, now of the Storrs Experiment Station, Middletown, Connecticut.

Probably the largest Cedar of Lebanon in the British Isles is one at Stanford Court, Worcester, which is about two hundred years old, and its branches shade a circle one hundred and sixteen feet in diameter. The trunk is twenty feet nine inches in circumference, and that of the largest branch is more than eleven feet.

A correspondent of the *Country Gentleman* writes that new Strawberry-plants should not be allowed to bear the first season, but that fruit-stems should be picked off as soon as they appear. Too many plants should not be allowed in the same space, as they consume the moisture, and, therefore, all suffer from drought and produce small berries. As a rule, each plant needs from four to six inches square of space to mature good fruit.

It is seldom that universal satisfaction with a new plant can be chronicled, but from every side we hear approval for the new Rose, Crimson Rambler, which is now in flower in many gardens for the first time. The plants, properly grown, are always remarkably vigorous and make thick long shoots. The flowers are produced in large clusters, even on small plants, and are of a pleasing crimson color. It is evidently perfectly hardy in all sections.

The second annual meeting of the Josselyn Botanical Society of Maine will be held in the State Normal School Building in Farmington, Maine, from July 7th to 10th. The society is composed of representative persons interested in Maine botany. The teaching of botany in schools, the study of fungi, mosses and aquatics, and the preparation of flowering plants for the herbarium are among the lecture subjects, and there will be field excursions.

The finest Corn fields in Lebanon valley, in eastern Pennsylvania, says the *Public Ledger*, of Philadelphia, are those on the 600 acres belonging to Isaac S. Long. The planting is done with great care, there being precisely the same number of stalks in each row. Mr. Long provides against delay in growth in cases of replanting in the fields by planting one seed of corn in each of 5,000 flower-pots set out in the open. At replanting time this year a hole was made wherever a stalk was missing and one of the young plants transferred from a pot. The potted stalks have grown well and are as large and thrifty as those first started in the field.

Corlears Hook Park, in this city, was formally opened to the public on Monday evening of last week by the Mayor and Park Commissioners, some 15,000 citizens being present. The park comprises about ten acres in a thickly populated section of the east side and fronts on the East River. The tract has been sodded, planted with trees and shrubs and provided with seats, and conveniently arranged broad walks laid with concrete. A shelter built of Indiana limestone, in Roman style, extends along a part of the western border. The Lookout, as this building is known, is intended to serve as a resting-place for the mothers and children of the district, and cost \$37,000. The park, which is on the site occupied by manufactories,

stone and lumber yards until two or three years ago, is already a verdurous and refreshing spot. A series of public concerts is arranged for Monday evenings through the summer.

Among the exhibits at the Rose and Strawberry show of the Massachusetts Horticultural Society, in Boston, last week, was the new seedling hardy Rose named M. H. Walsh, which last year received the first gold medal ever awarded to a new Rose by the society. The exhibitor was Hon. Joseph S. Fay, of Wood's Holl, M. H. Walsh, gardener. This Rose, which combines the qualities of vigorous habit, good color and substance, is thought by some to be the best of all the hardy dark red Roses. The petals shade from a deep red at the base to brilliant crimson at the tip, and some of the fully expanded flowers measure six inches across. The stock has been purchased by Peter Henderson & Co., of New York, who will send it out next year.

Arbor Day, which every one knows to be an American institution, has been adopted in Spain by royal command. On March 26th, of this year, the Queen Regent and her Court went with the young King to some grounds lying about two miles to the eastward of Madrid. There the King ceremoniously planted a Pine-sapling, and afterward the same act was performed by each of the two thousand children who had been chosen as his associates from the public schools of the city. All expenses were defrayed by the city, and each child received a medal bearing the inscription, "First Fête of the Tree. Instituted in the Reign of Alfonso XIII., 1896." Similar fêtes are to be held yearly hereafter until the environs of Madrid are well planted. Nor will the children be allowed, as so often happens in this country, to think their work finished with the mere act of planting the trees. They are to be taken periodically by their schoolmasters to inspect their plantations, and will be taught to foster tree-planting wherever and however it may hereafter be in their power so to do.

Twenty-six car-loads of California fruits were sold in this city last week. The season for cherries is nearly ended, but large and showy specimens of Royal Ann, Black Tartarian, Black Republican and Napoleon Bigarreau are still seen. Among varieties of plums now coming from the Pacific coast are Burbank, large greenish yellow, with a flush of pink; Prunus Simoni, large, flattened with deep cavities at base and apex, yellow flesh with aromatic flavor, the fruit large and brick-red in color; Cherry, pale red; Royal Hative, light purple; Clyman, mottled reddish purple, with beautiful blue bloom; Abundance, Koning Claudie, Saint Catherine, and Tragedy prunes. Montgamet apricots are the largest and best specimens of this fruit now in season; other good sorts in market are the English variety Moorpark; Peach, a little earlier than Moorpark, deep orange mottled with brown; and the French variety, Royal. The well-known Alexander, Briggs' Red May, Hale's Early and Governor Garland peaches are coming from California. New figs and Harvest apples are also arriving from the western coast, and Madeline, Sugar and Bartlett pears. With these new crop fruits are offered last year's P. Barry pears, held in cold storage.

The *Journal of Commerce* of this city in a recent editorial on new fibres states that artificial silk is now successfully made from wood pulp. The pulp is boiled in nitric and sulphuric acids, a process suggestive of gun cotton making, and is then squeezed under hydraulic pressure, washed in water, dried, and agitated in alcohol and ether. Its inflammability is also counteracted. After passing through a filtering process it appears like a solution of gum and is forced by pneumatic pressure through pipes that lead to glass tubes, each of which ends in a microscopic aperture. The gummy substance emerges as a filament very much like that spun by the silk-worm, and so fine that six or eight or ten are joined for spinning into a thread. This artificial silk is said to take dye better than natural silk and to have a higher lustre; the strength of the threads is only four-fifths that of natural silk. Dress goods and other products of the artificial silk imported from France are sold in London. A factory for its production is now being built near Manchester, and six weaving establishments have contracted for the output. In Europe and America chemists and mechanics have been working to cheapen the preparation of Ramie, and a new process is soon to be tested in a factory in Brooklyn. Besides the remarkable strength of Ramie fibre, its high lustre makes it available as an adulterant, if not a substitute, for silk. It is stronger than hemp and lighter than duck, and if it can be produced cheaply enough it will be available for sails and cordage and for wearing and household fabrics.

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Privacy in Suburban Life.

IN an article on "Suburban Homes" in *The Cosmopolitan* for June, Mr. R. Clipston Sturgis says that more individuality, more separateness, more seclusion should be achieved in the arrangement and planting of the grounds about suburban houses of the better class than is usually achieved or even desired in America to-day. This sentiment is not only in the interests of beauty as such, but still more in the interests of humanity. The article goes on to say that the lives led by the owners of such houses should be more individual, more private, more truly domestic and more closely in touch with nature, and that this cannot be accomplished unless the character of their environments is changed.

This is sound doctrine, and Mr. Sturgis preaches it with an attractive enthusiasm which, however, is not altogether wise in the special line it takes. The text is the English suburban garden as permitting and determining English habits of suburban life. But the local obstacles are not noted which stand in the way of a widespread acceptance in America of the gospel of privacy and seclusion upon this particular Anglican basis. And, therefore, many readers may fail to be convinced of the truth of the gospel itself. Our wish just now is to show the soundness of the general statements before we try to point out the errors made in their application.

Speaking first of English suburban houses themselves, Mr. Sturgis says that, whether old or new, owned by the rich man or the artisan, they have "an air of comfort and quiet dignity, they look substantial, respectable, self-contained, inviting; in a word, they are homelike." Our own, on the contrary, are usually "frame houses, looking unsubstantial and temporary. They convey no suggestion of dignity and retirement. They do, indeed, look hospitable and open, and have an air of saying, 'All mine is yours; pray, enjoy it!' They even invite you to look in on their grounds and through their open windows, where the English house says, 'Don't come in unless you know us.' But notwithstanding all this, I think on account of all this they are not so pleasant to look upon nor so sweet to live in."

There is truth in these words, and a great part of the difference they mark might profitably be done away with.

As long as economy—which, most often, means necessity—bids the American build with wood, it will be more difficult to give a look of permanence and stability to his house than to the Englishman's; and upon this look, of course, must largely depend its air of dignity. But it is by no means impossible to achieve stability and dignity of effect even with wood. The main trouble is not with our material, but with the way in which we use it, preferring showiness to quietness, variety to harmony, over-elaboration to simplicity, loudness to modesty, evident costliness to a well-bred reticence.

But the outer aspect of a house, while it may reveal the owner's character and thus give an insight into his probable habits of life, does not actually mould and determine these habits. They are more directly moulded and determined by the disposition of the interior of his house. It is impossible to lead a comfortable, sensible, profitably occupied, quietly amused, genuinely domestic life in a house that has been planned and furnished "for show." Many American houses seem to have been built rather as places which may be proudly exhibited to visitors, or in which troops of guests may be sumptuously entertained, than as places in which the occupants, each in his or her individual way, will find the needs and desires of personal existence agreeably and adequately met. They are as well fitted for occupation by one family as by another, and they are not really well fitted for occupation by any family which finds its best pleasures in hours of privacy and domesticity.

We do not say that the majority of American suburban homes are of this kind. Even their exterior aspect is often more satisfactory than that of similar houses in other lands, as English architects have been the readiest to proclaim. And many appear unsatisfactory on the outside (owing, perhaps, to the architect's, rather than the owner's, lack of good sense), which, when one enters them, present a very different face. Probably we exaggerate the relative number of those which are really undomestic within as well as without, because the house built "for show" is the one most often exhibited. But against the environment of our suburban houses a much stronger indictment can be brought than against the houses themselves.

The character of the life that is led in a suburban house is determined, at least for seven or eight months in the year, very largely indeed by the character of its grounds. If the grounds are not beautiful, the sense of beauty will be dulled and distorted in those who perpetually gaze upon them. If they are planned for display, as ministers to pride and vanity, the general mental attitude of the family will be unfavorably affected. If they are not well adapted to outdoor repose or activity, and to the development of a personal interest in nature and her products, they will not be lived in; the days of the family will be passed indoors or passed away from home; and the true enjoyments, like the true refining, softening and cultivating influences of rural or semi-rural life, will be altogether missed. And if the grounds are adapted to outdoor living they must have a good measure of privacy—of seclusion. The English suburban place, says Mr. Sturgis, "gives the householder quiet, rest and retirement." These are the results of separateness, protection, privacy; and it is their possession which fosters, not only the typical English love of nature, but the typical English form of domestic life—reserved, intimate and thoroughly domestic, yet hospitable in the best sense of the word, because the truest hospitality is that which admits the outsider into the most homelike home.

Quite different from this is the current American ideal of beauty, comfort and convenience as expressed in the surroundings of suburban homes. In colonial days we approached more nearly to the English ideal, as is shown by such streets as still exist in towns like Salem and Annapolis. As a rule, the English house is set back from the road, while the American colonial house is set upon it, or very near to it. But privacy for the grounds is in both cases achieved. Here they lie behind the house,

overlooked by the windows of its chief apartments; in England they are protected from the street by high walls or hedges. After colonial days we more frequently set our houses back from the street without giving them the full protection of the high English enclosure. But until within recent years they were separated, and, in general effect, at least, to some degree secluded, by walls or hedges or palings of moderate height and by screening plantations. Each still had individuality; each looked like a home, even though it gave evidence that its owners loved entire seclusion less than their English cousins. Within recent years, however, there has been a widespread desire to abolish the last semblance of separateness—of privacy. In countless old towns and villages the barriers have been destroyed, and each man's garden merges in his neighbor's, while all merge indistinguishably in the grassy border of the street. On many new streets the most admired type of place seems to be one where there is an abundance of well-kept grass and a great overabundance of graveled drives and walks; where there are no large trees nor luxuriant shrubberies, but a casual sprinkling of small supposedly "ornamental" trees and isolated shrubs; no masses of freely flowering plants, but many gaudy beds of clipped foliage-plants or formally arranged flowers, dropped, like chromos on a green wall, upon the bright emerald expanse of the lawns. Here, indeed, is no privacy, no seclusion, no possibility of outdoor repose, or of outdoor activity, except in the form of a game of tennis played under the eyes of the whole town; and, of course, there is no more beauty than there is comfort or convenience. It is idle to think that people who live, or children who are brought up, in a place like this, will learn to love the country, or will be civilized and sweetened by the influences of nature. They are actually worse off than the dweller in cities; for he may at least know what natural beauty really is and appreciate it when he has the chance to see it, while they confuse natural beauty with the barren ugliness they have themselves produced, and can have no eyes or heart for its charm when it really lies before them.

Truly, Mr. Sturgis's appeal for more privacy, more seclusion, more individuality in our suburban homes needed to be made. The explanation of the belief that he has not made it along just the right lines must be postponed to another day.

The Redwood Flora in April.

DURING the month of April I left my home in the interior valleys and rode to the Mendocino sea coast. The air was sharp and the high mountains in the north-east were covered with snow, but the valleys and hillsides about them were in the full springtide of bloom, and flowers were everywhere. Ten miles of mountain climbing, and the summit of the range which separates the valleys from the coast region is reached at an elevation of 2,300 feet. The elevation seemed to make little perceptible difference in grass or flowers, although the woods showed the influence of the sea breezes in greater vigor. A mile to the westward the beginning of the great Redwood forest could be seen, and north, south and west, as far as the eye could reach, stretched the noblest forest in the world. Half of all the Redwood forest was in view, and from the Russian River, south of here fifty miles, to Alaska, stretches an almost unbroken wood. A few miles down a tortuous grade and the forest's vanguard is met. The first Redwoods were fine specimens, five to seven feet through and hundreds high. This was at Orr's Springs, and a small grove on the mountain side contains some of the largest trees in Mendocino County's forests.

In the cold and deeply shaded cañon, vegetation was backward, and our pretty Wake Robin, *Trillium ovatum*, so like the *T. grandiflorum* of the eastern woods, was nearly gone. A few still retained the deep purple petals

to which their pure white flowers change with age. *Trillium sessile*, var. *Californicum*, was in blossom in the small openings along the stream. In our part of California they are at first white with a purple centre, and later take a purple tinge; about San Francisco Bay, and in the southern Sierras they are a red purple, while a flower reached me this season from the Big Tree region of the Sierras which was of that velvety black purple one sees in some Arums. In February, when I was last in the Redwood region, *Cardamine paucisecta* was in bloom, a very attractive little plant with the lower cordate leaves purple beneath and mottled in white and purple above. The flowers are rather attractive, white, with the purplish caste so common in these woods. In April it was still in bloom in cold spots.

For miles down the cool cañon, in groups of a few, or occasional beds of hundreds, *Erythronium giganteum* was conspicuously beautiful. This is the Dog-tooth Violet of the Californian Coast Ranges and beloved of all children. As *E. grandiflorum* it is the best known of the many Pacific coast *Erythroniums* in the garden. The straw-colored flowers with orange centres recurve to the stem. In these woods they grow very large, and I have seen them frequently with eight to sixteen on a stem, and three to four inches across. In April they are in full bloom and worth a pilgrimage to see. The leaves are as large as a man's hand and mottled in mahogany.

On down through the dense woods, past openings cleared by the loggers of the big coast sawmills, and through small openings, on which, for some unexplainable reason, the forest never grew, but which support a luxuriant growth of grass, the road passes. In places rock masses were to be seen clothed with Ferns, *Polypodiums* and *Adiantums*, the latter just throwing up their young fronds.

A glimmer of pink in the deep woods between two Redwoods shows where a colony of that dainty Orchid, *Calypso borealis*, has established itself in the mold. It is a rarity in these woods, and the flowers duly prized. Miles below, the road leaves the cañon, and by a grade along the mountain side ascends to the ridge which divides two of the principal streams of the Redwood belt. The grade is on the north side of the cañon through dense woods, and the flowers are correspondingly backward. Where it crosses a small stream the Sword Fern, *Aspidium munitum*, var. *rigidum*, grows in great beauty, and the new fronds are well developed. This Fern, rare in the interior, grows in great numbers in all of the cañons and shaded woods of the immediate coast region. On a shaded bank by the roadside the Wood Anemone, *A. nemorosa*, was in full bloom. In February it was blooming in warm places.

On the south side of the ridge the flowers were farther along. In a little opening I saw many *Zygadenus paniculatus* in flower. The branching stems were two feet high, and the greenish white bloom not unprepossessing. Along the road I noticed the pink *Lathyrus venosus*, our Wild Pea; handsome plants of *Cynoglossum grande*, with purple, white-centred flowers, and the first flowers of *Ceanothus thrysiflorus*, a handsome shrub, which on the coast takes possession of the cleared woods and attains the size of a small tree; Blue Blossoms it is called here, and it deserves a high rank for beauty. When the long slopes are wavy masses of its blue flowers it is a lovely sight.

In the timber the Blueberries grow tall, five to seven feet. At this time they are beginning to blossom, but the pink flowers are not as showy as the dark red new growth which was starting. Most of the greens of the Redwood are dark and sombre at maturity, but the new shoots a light green, and with the fresh plumes of the brake, now just unfolding, the feathery shoots of the Douglas Spruce and the foliage of the Sweetbrier the woods are lighter than at any other season. At a wayside ranch, as the little clearing on the steep hillside is called, the Apples are in flower. The road again returned to a river-side, and for miles was through a forest which was cut about twenty years ago.

The thickets of sprouts encircling the stumps are already from forty to fifty feet high, and dense masses of Douglas Spruce and Fir (*Abies grandis*), seedlings since the woods were cut, are nearly as tall. No one seeing the second growth in the Redwood forest needs to be told that only intelligent forestry is needed to make them furnish a vast and inexhaustible supply of timber. A very large proportion of the large trees now standing are sprouts from an older growth, as is attested by the grouping, the one-sided trunks and the hollows between the individuals of the groups showing where the old trunk burned or rotted out. The stream was used by the loggers for years in getting their logs from the forest to the mill at the seaside, and their channels are cut deep and their beds smoothed by the irresistible force of the great logs driven by a strong flood current. Mosses and Ferns clothe the bed and bottom, and overhanging the sides the deciduous *Rhododendron occidentale* grows in plenty. From the floor of a side cañon, into which the road now turns, great trees, the finest yet encountered, tower to a height of three hundred feet. The woods are dark and cold, the ground covered with the creeping Salal, *Gaultheria Shallon*. By the side of the sluggish stream the Lady Fern grows and *Trillium ovatum* is still fresh in the deep shade. In a little bog in a clearing the handsome Scarlet Currant, *Ribes sanguineum*, is in full glow, and at a distance of twelve miles from the ocean *Rhododendron Californicum*, our large-leaved evergreen Rose Bay, is first seen. Other miles of noble woods are passed through, alternating with clearings, where the lumber was cut for ties, and neat homes now take the forest's place, or the trees have just been felled, and the tie-maker having cleared the débris by fire is now hewing out the trees, and the tender young growth is springing from the charred groups. In the woods the evergreen Barberry, *Berberis Aquifolium*, is in masses, now bearing racemes of yellow flowers, and the Wood Sorrel, with its pink-purple flowers, carpets every surface not already occupied. The cold banks above the roadside are crowded with Ferns, among which the Maiden-hair, *Adiantum pedatum*, appears, and burned woods are yellow with a Wood Violet, *Viola sarmentosa*.

The barren is always the same, except when lighted up by the *Rhododendrons*, the first of which were just blooming in the tangle of Scrub Pine, Cypress and bushes. A few miles of this dreary, but interesting, waste and the last seaward slope is descended through a half-cut forest, a perfect tangle of great, almost naked trunks, their limbs swept off in the fall of the Redwoods, but still vigorous, standing in among myriads of tall young trees of *Pinus muricata*, *Abies grandis*, the lovely Weeping Hemlock, *Tsuga Mertensiana*, and young Redwoods, the logs and brush overgrown by Blueberries, Salal, Salmon-berries and *Rubus Nutkanus*, all bursting into new leaf, with great glowing pink clumps of *Rhododendron*, here in the fullness of their exquisite flowering.

A vista of the sea, of a rock-bound coast and dashing surf, of green slopes covered with grain, and Mendocino is reached, with houses embowered in Fuchsias, and hedges of Callas in blossom and Marguerites everywhere, while Foxgloves run riot down the gutters.

Ukiah, Calif.

Carl Purdy.

Forms of some European Conifers.—II.

I HAVE already spoken of certain forms of the European Spruce which are not varieties in the botanical sense, but modifications of development. There is, however, on the Alps a single botanical variety of much interest, because it shows the close relationship of our European Spruce with other species of the genus. It is the form *medioxima* of Nylander. This tree grows in more or less isolated groups on the central ranges; in the Haut Valais, in Engadine, and also, although less commonly, on lower mountain ranges, and may be distinguished by two characters from the ordinary Spruce-tree. From this it differs, first, by its shorter, much thicker and more rigid leaves, which are more obtuse and marked by four white stomatiferous bands

which give to this tree a certain resemblance to the Fir, *Abies pectinata*. Secondly, the fruit is shorter, with more delicate scales, flat and rounded at the apex, the cone being only about half the size of the cone of the ordinary type, with only about two-thirds as many scales. These scales are flexible, with entire margins, the whole cone resembling in a singular manner the cones of the Black Spruce of America. There is a tree of similar form in Finland and Sweden, while the *Picea obovata* of Siberia is only a more accentuated variety with cones which are similar, although still smaller. *Picea obovata* is closely allied to the American species, and our alpine variety *medioxima* is the representative of a series of species of the extreme north, which has been preserved on the mountains of Europe since the glacial epoch.

I will now consider the forms of the Fir, *Abies pectinata*, found on our mountains. It is a tree very uniform in habit, showing fewer modifications from the normal type of growth than the Spruce. Nevertheless, it is possible to distinguish the form *alpestris*, which, although not common, is found occasionally at elevations of three to four thousand feet above the sea-level. It is a rather feeble tree with short and rather erect branches, so that the white surfaces of the leaves are presented to the eye, giving the tree a strange appearance. Mention must also be made of the form *candelabra*, which may be seen scattered here and there through the Jura and on the Alps, although always isolated in alpine pastures. It is a splendid tree, often of enormous dimensions, with elongated horizontal lower branches which become very stout and develop lateral shoots which grow straight up and have the appearance of young perfectly developed Fir-trees, with the appearance of little trees grafted on the old branches. These great Fir-trees present a most curious aspect, resembling candelabras of eight or ten or more branches. Apparently our Fir is liable to grow into this form anywhere within the area of its distribution when it is not crowded by other trees. Unger & Kotschy figured it in their work on the Island of Cyprus, and it does not appear to be rare in Greece. Of purely botanical varieties of the Fir, a form with pointed leaves is common in south-eastern Europe. Trees with this peculiarity of foliage have been described as *Abies Apollinis* and *A. Reginae-Amaliae*. They can only be distinguished from the tree of central Europe by their pointed leaves. These on the ordinary form are confined to the upper and fruitful branches, although they sometimes occur on branches near the middle of the tree. On *A. Cephalonica*, of the island of Cephalonia, another form of the common Fir, the pointed leaves are the most numerous, appearing even on seedling plants.

It may, perhaps, be interesting to sketch the distribution of the Spruce and Fir in Europe, as the regions occupied by these two trees are so different. The Spruce is a tree of the north of Europe, being found in the south only at high elevations. The Fir, on the contrary, is a tree of the mountains of temperate Europe, unknown in the north, and descending southward over the mountain ranges of the Mediterranean basin. The Spruce covers the plains of Russia from the Ural Mountains, crosses Finland, Scandinavia, the Baltic Provinces, and enters Germany from Lithuania, but in the west it leaves the plains and covers the mountains of Germany to the Vosges, reappearing on the mountains of central France, and finally disappears in the Pyrenees without entering the Spanish peninsula. It covers the Alps, but does not enter Italy, and becoming rare on the mountain ranges of eastern Europe it does not show itself beyond Transylvania, where it is replaced by *Picea orientalis*, or extend to the Caucasus. The Fir, on the other hand, has its centre of distribution in the German mountains and in the Alps, growing on all the ranges from the Pyrenees to the Carpathians and on those of Greece and European Turkey. It does not descend into the plains or extend into the Caucasus, where it is replaced by *Abies Nordmanniana*. It extends, however, along the Apennines to Sicily; it is common in Greece at elevations

of from three thousand to four thousand five hundred feet ; it does not, however, exist on the mountain ranges of Spain, where, in the south, it is replaced by *Abies Pinsapo*, a species with quadrangular leaves.

Bâle, Switzerland.

H. Christ.

Pineapple-growing in Florida.

LOCATION.

UNLIKE the cultivation of Oranges, which is a general industry in Florida, Pineapple-growing is extremely local. While there is one general region whose main investment is in Pineapple-growing, there are several smaller districts which make this a prominent industry. The northernmost place where this industry is carried on to a considerable extent is Orlando. The surface of the country is level and only slightly raised above the water in the lakes. There is no eminence which can be dignified as a hill. The soil is generally sandy, with considerable vegetable matter intermixed, as a rule, and, as a whole, excellent for Orange groves, except that much of it needs draining. Well-drained and elevated places are the best for Pineapple-growing. Unbroken tracts fifteen or twenty acres in extent, with all the requisites naturally suitable for this crop, are not common. This section is far enough south to be protected from most of the heavy winter frosts, and but few light frosts occur. Such a heavy freeze as occurred in December, 1894, is fatal to Pineapple cultivation. Slight frosts are not unknown here as late as the 20th of March.

Avon Park is located about sixty miles south of Orlando, in a high, dry, flat woods country. Flat woods is the local name for the level Pine woods land. This district has a greater elevation than Orlando and is more exempt from slight frosts. As a whole, this section is rather drier than typical Orange land. This district has no railway communication, consequently the industry cannot be carried on very extensively.

Myers is located on the south banks of the Caloosahatchee River, and about 150 miles south of Orlando. While Pineapples are not extensively cultivated here, the industry is of sufficient importance to attract the notice of commercial carriers. The fruit has to be carried in small sailboats and transferred to cars at convenient points. While the land is usually low, it is at some places rolling, and usually covered with Pine-woods. The Pineapples are grown largely, however, on the drained land. The ideal land for Pineapples is not met in this section. This is more than compensated for in the fact that frosts rarely occur, and even the most severe freezes have not been sufficient to destroy the oranges or pineapples in this section. A frost is exceptional in this part of the country. Tomatoes are grown here for the winter markets. When the railroad shall have reached this section it will doubtless become one of the important centres for raising pineapples.

The keys are coralline islands skirting the southern coast of Florida. They range in size from a few square rods to many acres, and from sterile to fertile. Here are ideal conditions for the cultivation of Pineapples. The climate is largely affected by the trade winds and Gulf stream, and the year is divided into wet and dry seasons. On many of the islands frosts are almost unknown. The formation permits free drainage. The industry began on these islands, but it is not carried on so extensively nor so intensively as on the mainland.

East Coast is the general term given to the section along the Atlantic coast from the north end of the Indian River to the lower end of Biscayne Bay. The Pineapple section of this country begins near Melbourne, or a little north, and stretches about 200 miles south. On the west shore of the Indian River, or, more properly speaking, on the coast of the mainland, the land is made up largely of sand dunes, and for some distance back from the immediate shore the country has the character of old sand dunes overgrown with vegetation. The soil is generally rather coarse sand, with usually a slight amount of vegetable matter, it often

running as low as three per cent., and Pineapples have been planted on land containing even less vegetable matter. This high, dry, sterile sand is considered the ideal soil for Pineapples by the growers of the east coast, and can be obtained in unbroken blocks of hundreds of acres. The sand dunes sometimes rise to the dignity of hills, but all have a gentle undulating character. It should be understood that the portions planted to Pineapples are not the newly formed sand dunes, nor always those on the immediate coast. At several places, as in Jensen, the Pineapple-fields run down to the edge of the water, there being no barren sand dunes in this section. The land some miles back in the country has not been used for Pineapple-growing, though much of it is suitable. The section immediately north of Melbourne is visited by slight frosts about once in three or four years, and freezes sometimes occur, but if the winds happen to be from the north-east, as they usually are during frosts in the interior, there is no great danger to the islands or along the immediate coast of the Indian River. The warmth given off by the adjacent waters is usually sufficient protection, and this whole section is more exempt from freezes than any other portion of the state in the same latitude, consequently Pineapple-growing without protection is carried on much farther north along the east coast than in any other part of Florida. Though the freezes of December, 1894, and February, 1895, were severely felt, the damage was comparatively light, as was shown by the amount of fruit shipped from this section during the summer of 1895.

SOIL.

The ideal soil for Pineapple-growing, as stated before, is high, dry sand, with but a very small percentage of vegetable matter; not that the latter is disadvantageous, but there are other conditions governing the introduction of vegetable matter which are at times detrimental to the growth of this plant. There is no doubt that low sandy land containing much vegetable matter, when well drained and made perfectly dry, is a favorable soil for this crop. It is not uncommon to select sterile land and supply the vegetable matter as a fertilizer, usually in the form of cotton-seed meal. Drainage is of first importance and may be natural or artificial, and irrigation is needed. Flat land must be drained during the rainy season and irrigated during the dry, to obtain the best results. The field is prepared with much more care than is usually given for a vegetable crop. All débris is removed. Slight depressions are filled in and sharp elevations cut down, so as to make the land either quite level or gently undulating.

CULTIVATION.

After the field has been thoroughly cleared it is laid off in checks. The usual distances are from one and one-half feet to two and one-half feet. Roads are provided for travel and to cart the gathered fruit, and these vary from a few feet to ten or fifteen rods apart. The breaking of the leaves is injurious to the crop, and most of the work has to be done by hand. During its early growth a hoe of the ordinary sort may be used, but later it is necessary to use a shuffle hoe, to cut the weeds under the leaves. The root-system of this plant is weak and the plants cannot stand alone, but require the support of their neighbors by bracing themselves with their leaves. Various kinds of fertilizers have been used, with varying degrees of success. Stable manure is desirable where it can be obtained at a reasonable price. The industry is too new to give definite information, and it is only certain that some kind of fertilizer should be used.

VARIETIES.

The Red Spanish variety is probably most widely grown and one of the earliest introduced. While still quite popular it is being rapidly crowded out by finer varieties. It is grown largely on the keys. It is a small fruit of good flavor. Smooth Cayenne has one desirable feature which serves at the same time as a means for recognizing it—that is, the edges of its leaves are quite free from serrations.

The fruit grows large, of fine texture and good quality. Envile City is another strongly marked variety of the better Pines. In place of the central strong leaves usually produced at the apex of the fruit many small crown slips grow. Besides these varieties there are others that produce large fruit of good quality.

PROPAGATION.

There are two general ways of propagating Pineapples. The most common and desirable method is from buds which form at the ground-level, or just below, and come up in the form of young plants. These produce a crop about a year earlier than the slips. They are usually called

others very sparingly. The seeds may be planted and germinated in the ordinary way.

SHEDS.

It has long been an established fact that pineapples grown indoors in England are of finer texture and superior flavor to those grown in the open air of the tropics. The structures used in Florida are novel. Posts are set at convenient distances from ten to twenty feet apart in checks. Suitable rafters are then placed from post to post uniting them in rows. Crosswise of these rows is laid one-by-four-inch sheeting, allowing a distance between the slats just equal to the width of a slat, so that one-half of the space is cov-



Fig. 38.—Pineapples Grown under Sheds in Florida.—See page 274.

suckers. Slips is the name applied to smaller plants that are produced immediately below the fruit. Sometimes they are allowed to remain on the plants until they are large enough to be set in the field. A fruiting plant will often produce twenty or more, and the slips are the most prolific way of reproduction, though not the most desirable, since they take a year longer to come to maturity. The crown of the Pineapple when taken out and planted will produce sets. This has been resorted to with high-priced varieties, but is not usually practiced. It is quite generally believed that Pineapples do not produce seed. This, however, is quite as erroneous as the belief that pineapples grow on Pine-trees. Some varieties produce seed quite freely and

ered. The illustration on this page shows a shed constructed near Palm Beach. The posts have been tied together both ways; the picture represents a view across the slats, making the cover appear continuous. The posts are long enough to raise the shed from six to nine feet above the ground, giving room for cultivation. Lumber can be obtained from the mills at \$6 or \$8 a thousand feet; the cost of sheds varies from \$400 to \$600 per acre. At first they were constructed to prevent injury from slight frosts, but as they were allowed to remain during the summer it was soon discovered that the fruit was considerably larger than that grown in the open field. The size of the fruit is not the only advantage, but the texture is more tender and

the flavor much better. Later it was discovered that these Pines come into bearing during various portions of the year, thus giving marketable fruit in November and until the close of the pineapple season. The pioneers in this work were regarded as visionary, and it doubtless took a great deal of courage to invest about \$4,000 for building an eight-acre shed, but now this plan has been extended to such places as Palm Beach, where Cocoanuts flourish and the danger of frosts is very slight. When it is remembered that a single fruit of good size and quality sells for \$1.00 in the pinery at Christmas it is readily seen that this protection is profitable, even in the extreme south, as few fields, even on the keys, are never visited by frosts. There are no pineapples grown under glass for commercial purposes in Florida.

EXTENT OF THE INDUSTRY.

Professor H. J. Webber, Eustis, Florida, special agent for the Division of Vegetable Pathology and Physiology, United States Department of Agriculture, gave the following figures in his paper before the Florida Horticultural Society: number of acres in Pineapples in 1894, in the Avon Park region, 100; Orlando region, 30; Myers, 3; on the keys, 300; the East Coast, 2,056—making a total of 2,389 acres. The figures were obtained by diligent inquiry in visits to many fields of the regions. The freight department of Florida railroads shipped, according to the same paper, 56,209 crates, or about 3,000,000 fruits in the same year. This does not include the local consumption, those sent out of the state by express, nor those carried from the keys in boats and not transferred to railroads.

Agricultural College, Lake City, Fla.

P. H. Rolfs.

Plant Notes.

IRIS HEXAGONA, LA MANCE.—Another season's growth of this Arkansas variety confirms the first impression as to its being a handsome form. Among the many Irises it would be difficult to name the most beautiful and pleasing, but this has claims to be numbered among the choicest of a generally handsome family. There are others of more delicate and quaint hues, but the color of this is as nearly blue as is found in flowers. The flowers are wide-spreading, with flat segments, and three or four are borne on short pedicels on one side of a leafy prostrate stem. It is perfectly hardy and has long, thick, creeping rhizomes. The white-flowered form of *Iris hexagona*, discovered in Florida by Mr. Mead, does not prove to be hardy here.

HYDRANGEA QUERCIFOLIA.—Of the plants now in bloom in shrubberies this bush is conspicuous by its large cymes of showy flowers. The heads are pyramidal in outline. The sterile flowers are quite numerous and entirely hide the fertile ones on the inside. On first opening the sterile flowers are rich creamy white, changing eventually to a pinkish tinge. The plant in a young state has a rather straggling, or one-sided, appearance, but when it grows older it becomes a compact and neat bush. The leaves are five-lobed and quite large. The petioles and young wood are densely covered with a rusty colored downy substance. Perhaps the reason it is not more abundant in collections is the difficulty of propagation. It is exceedingly slow in rooting from cuttings at any season of the year. *Hydrangea quercifolia* is found growing in partly shaded places in Florida, Georgia and westward, and is quite hardy in most of the northern states.

PHILADELPHUS LEMOINEI.—A figure of this hybrid plant was published in 1889 in the second volume of this journal, when it had not flowered in the United States and nothing was known of its value here as a garden plant. *Philadelphus Lemoinei* had been raised by Monsieur Lemoine of Nancy, who, in 1884, had crossed the Old World *Philadelphus coronarius* with *Philadelphus microphyllus*, a native of the Rocky Mountains of Colorado. *Philadelphus Lemoinei* has now been grown in the Arnold Arboretum for six years and has proved itself perfectly hardy and a

most desirable and beautiful garden plant. The stems, which are about two feet high, were clothed last week with fragrant white flowers which are intermediate in size and in the time of opening between those of the two parents. For a small garden where the common bush *Syringas* are too large *Philadelphus Lemoinei* will supply in miniature their white flowers and delightful perfume. It is a temptation which too frequently is not resisted to over-praise new plants, but in this case it does not seem easy to say too much of the merits of a shrub which Monsieur Lemoine has good right to consider one of his most important contributions to the flora of gardens.

YELLOW ROSES.—Hardy yellow Roses have produced exceptionally large crops of fine flowers this year in many northern gardens, and the beauty of these plants has never been more striking. There are two yellow-flowered Roses, *Rosa sulphurea*, often called *Rosa hemisphaerica*, and *Rosa Eglanteria*; the former has been known in European gardens in a double form since the sixteenth century; but it was not until 1830 that the single form was discovered. It is a native of Asia Minor, Armenia and Persia, and in 1859 the single form was described by the Swiss botanist, Boissier, under the name of *Rapinni*. So far as we know, neither the single nor the double-flowered form of this Rose is in our gardens, and it is believed to be more tender than *Rosa Eglanteria*, which is also often called *Rosa lutea*, and is a native of western Asia. This is the single-flowered yellow Rose of old gardens, and as a garden plant is one of the most charming shrubs in cultivation. A form of this plant, with the petals dark copper-colored or red on the upper surface and yellow on the lower, is one of the most distinct of Roses. The origin of this form, which is commonly called the Austrian Copper Brier, is uncertain. It has been in gardens for more than a century, and has a rather weak constitution, and is hard to keep for many years at a time except in specially favorable situations. The Persian yellow Rose is the double-flowered form of *Rosa Eglanteria*, and a common plant in many old gardens. It is not always a free bloomer, and the flowers do not open satisfactorily in this climate, but this year the plants have been generally covered with large well-formed blooms. Harrison's yellow Rose, which is the common yellow Rose of American gardens, is supposed to be a hybrid between *Rosa Eglanteria* and the Scotch Rose, *Rosa spinosissima*, but nothing is known of its history, and we shall be glad of any information our readers may be able to give us concerning it. It is a hardy free-blooming plant, but the flowers are less beautiful and fragrant than those of the double Persian yellow Rose. The flowers, like those of all the varieties of *Rosa Eglanteria*, have the perfume of the Sweetbrier.

NEW HYBRID ROSES.—A season or two since Mr. W. A. Manda crossed *Rosa Wichuraiana* with various other species and varieties, *Eglantine*, a number of the most attractive Teas, American Beauty and General Jacqueminot. The hybrids have lately been shown at South Orange, planted out on bare sandy banks, in positions where *R. Wichuraiana* is especially valuable and attractive. In character of foliage and habit of growth they resemble the prostrate rambling parent, but the crossing has produced a most remarkable series of free-flowering plants with handsome fragrant flowers. One attractive hybrid has clusters of pink single flowers similar to those of the Sweetbrier. Another, pure pink double flowers, the buds of which resemble in miniature the Bridesmaid. There are also several forms with double white flowers. One of these with a delicate pink hue is peculiar and distinct, the numerous small, rounded petals being reflexed and perfectly imbricated, an arrangement not usual among Roses. Mr. Manda has also a number of other forms, mostly pink or rose in color, and varying in shape and number of petals, which he proposes naming and offering next year. These hybrids must meet with great favor with planters, as they add a brilliancy or warmth of color to a valuable Rose.

Cultural Department.

Seasonable Work.

THE various insect pests with which we have to battle now indoors make quite a catalogue, among the most common being white, black and brown scale, and various intermediate forms of these insects, red spiders, thrips (both black and yellow) and mealy bugs of several varieties and degrees of fecundity. For the latter a hot-water bath may be used successfully in some cases, at least with plants having sufficiently tough foliage to endure such treatment, but careful experiments should be made before submitting valuable plants to this ordeal. A method I have used for this operation was that of placing a metal vessel—for example, a large galvanized iron pail—on an oil-stove, the pail to be filled with clean water heated to a temperature of 130 degrees, Fahrenheit, and by proper regulation of the oil flame this temperature may be maintained without a variation of more than two degrees. A thermometer should be suspended in the bath in order that any material variation of temperature may be at once corrected.

Immersion in water at this temperature (130 degrees) for a period varying from thirty to ninety seconds resulted in no injury to the foliage of the plants thus treated, and in some instances every mealy bug on the plant was killed, while in others an occasional insect escaped, possibly by being protected from contact with the water by a surrounding air-bubble. The plants thus treated were Palms, and included *Areca lutescens*, *Latania Borbonica*, *Kentia Forsteriana* and *Cocos Weddelliana*.

At a slightly higher temperature, ranging from 135 to 138 degrees, *Arecas* and *Latantias* did not seem to suffer in the least, but *Cocos* and *Kentia* were both injured, the latter most severely. The plants subjected to the second experiment were apparently in the same condition as to growth and health as the specimens used for the first, and the injury was not at once apparent, but became quite noticeable five or six days afterward. Some forms of scale were also killed by a water-bath at 135 degrees, but others appeared to be but little affected thereby. Of course, these simple experiments do not prove hot water to be a panacea for the insect-ills of plants, but they may encourage further research for information on this line.

The so-called fumigation of plants by means of a mixture of dilute sulphuric acid and cyanide of potassium has been reported in some horticultural journals within the past three months, but is a process that should only be attempted with extreme precaution. The reaction from this admixture (if I am not mistaken) is a strong solution of hydrocyanic acid, one of the most deadly poisons even by inhalation. Some idea of its strength may be had from the fact that the medicinal solution of this acid as prepared by chemists only contains two per cent. of the pure drug, while the solution procured by the process above noted probably contains from twelve to fifteen per cent. of the pure acid, and is, therefore, extremely dangerous.

Holmesburg, Pa.

W. H. Taplin.

Perennial Peas.

EVERLASTING or Perennial Peas are capital garden subjects where low-growing or trailing vines are desired. They are mostly vigorous, making a rapid and strong growth each season and flower freely. The best known of these are varieties of *Lathyrus latifolius*, of which the pink and red forms are most common. The white variety, however, is the better; the flowers have perfect purity of color, but are not fragrant. These forms are grown from seed, which germinate too freely in the borders. The white variety does not always come true from seed, and is better propagated by the side-shoots, which may be torn off early in the year when the plants start, or it may be propagated from the old vines used as cuttings in the fall. There are named kinds with bright-colored flowers which have been selected and propagated, but *L. rotundifolius* (or *Drummondii*) is the best of the colored kinds. This is also a vigorous species with vines of about the same length as those of *L. latifolius*. The flowers, which have smaller standards than these, are of a pleasing garnet hue. It does not seed very freely. *L. tuberosus* is a small-leaved, fine-stemmed plant, desirable as a trailer, and has dark red flowers. The tuberous roots are perfectly hardy and the plants are inclined to wander in the border.

The California Perennial Peas, *Lathyrus splendens*, *L. bactiflorus*, *L. violacea* and *L. sulphureus*, do not make much progress here, and as yet have not flowered. They are of thin,

rather delicate growth, but with slight protection may prove hardy, as those left outside survived last winter.

Elizabeth, N. J.

J. N. G.

Strawberry Culture.

A NUMBER of varieties of Strawberries are regarded in different sections as standard kinds, and it is puzzling to find some growers condemning sorts that others consider indispensable. The reason is that Strawberries are extremely local in their behavior, and soil and exposure have a great deal to do with the result; and the returns from a given variety vary as much as the localities in which the fruit is grown. In this climate a soil that has a clay bottom is not regarded suitable for Strawberry culture, as the plants suffer in spring from upheaving after the frosts. Our subsoil is gravel, and though it makes watering and mulching necessary, we get the best possible results each year. We plant a new bed in the summer months as soon as the runners have strong roots, and then destroy the bed that has borne for two summers. It does not pay to attempt to get a third crop from the plants; they lose vigor, many die out entirely, and the soil seems to be exhausted by the end of the second season. It is economy to plant at least a few every year so as to keep up the fertility of the varieties and to make sure of a good supply of the fruit.

We have tried many kinds, mainly to find out those best suited to our purpose, and each grower should experiment for himself if the varieties he has do not give satisfaction. We have sifted down to Michel's Early for the earliest, Parker Earle for second, and Gandy for late varieties, and these are sufficient for our needs. The Marshall has not been a success in this section; it winter-killed severely and made a poor crop this season. We shall not plant more of it this year.

As soon as all the fruit is gathered we clean the beds of all weeds and mulch. The soil in each alternate row is then lightly forked over and three-inch pots of soil plunged about the plants to receive the runners as soon as these are large enough. The runners will soon root, and when a wet season starts in, as usually happens in early August, we have the new ground ready and set out the young plants two feet apart in the rows and three feet between the rows. All runners should be kept off the young plants during the fall growing time. When setting out the plants care should be taken to set the cut ends of the runners of every two rows pointing toward each other. The next year all the runners will be thrown into one alley, and each alternate alley will be left free for use in watering the pots in dry weather. This plan involves little trouble at planting time and will save a great deal of time and labor the next year. A slight mulching in fall is necessary in this latitude, and we leave the mulch on late in spring to prevent the plants starting too early and having the early bloom killed by late spring frosts. It must, however, be taken off later, so that the surface may be well stirred up and a little fertilizer strewed round the plants. The lawn clippings should then be used as they are raked up; no better material can be had as a mulch to keep the earth cool and moist and to keep the fruit clean and free from grit. We get a good crop the first summer after planting, and this is when the largest fruit is gathered. In the bed that is bearing the second season the greatest quantity is produced. This ends the usefulness of the beds, which are afterward made over for fall Cabbages. The ground that will be planted later with young plants is now occupied with early vegetables, such as Spinach, Lettuce, Beans, Beets and others that will be past when the ground is needed for the Strawberry plants. In this way no time is lost nor ground wasted, as happens when spring planting is practiced. The plants are great feeders, and it is wise to provide liberally for them when starting a new bed. It should be dug or plowed deep to induce the roots to go down. Deep cultivation is one of the best possible remedies for dry periods, and each year seems to bring just such experiences with it.

South Lancaster, Mass.

E. O. Orpet.

Browallias.—These are among the most satisfactory of the annual flowering plants. They seem to revel in our hot, dry, summer weather. No soil appears to be too poor for them to make a creditable showing in, although they grow and flower more freely in that which has been enriched. *Browallia Roezli* is probably the most showy of the genus, and, next to *B. speciosa* major, has the largest flowers; these are lavender-colored on the outer part of the corolla and whitish near the centre, with a yellow eye, a most pleasing combination of color. This species has the further merit of producing a large number of flowers at one time. *B. elata purpurea* has much darker flowers than the type; they are quite a dark shade of purple with a white eye. In fading, however, the flowers assume a

whitish shade which detracts from their beauty. The same may be said of *B. speciosa major*; when the flowers of this beautiful variety are two or three days old they have a washed-out appearance. *B. demissa* was the first of the number to be introduced into cultivation. It is a rank grower; the flowers are small and of a pale purple color. *B. Czerwiakowski* is an upright-growing kind, with large leaves and pure white flowers. Although *Browallias* succeed well enough sown in the open border, they come into flower late in the season. If sown indoors and planted out about the first of May they are continually in bloom until frost, and it is well worth the extra trouble to treat them in this way.

Botanic Garden, Washington, D. C.

G. W. O.

Coronilla Capadocica.—This genus contains but few species that are regarded as hardy. *Coronilla varia* is, perhaps, the best known, and is a desirable species, and *C. Capadocica*, which is quite distinct, has proved to be a good garden plant and perfectly hardy. It is of prostrate habit, sending up in summer numerous spikes of the brightest golden-yellow flowers, which remind one of the blossoms of *Lotus corniculatus*, except that they are much larger. *C. Capadocica* is a native of Asia Minor, and is another of the many fine garden plants for which we are indebted to the energy and perseverance of Mr. Whittall. Plants grown here produce seeds freely and afford a ready means of propagation. As with all leguminous plants, it is best to start the seeds where the plants are to remain permanently, as it sometimes takes years for the plants to recover from the check caused by removal.

South Lancaster, Mass.

E. O. O.

Correspondence.

Notes from Natick, Massachusetts.

To the Editor of GARDEN AND FOREST:

Sir,—When Mr. H. S. Hunnewell started his new place in Natick, close to the Wellesley line, some five years ago, he scarcely realized the magnitude of the task he had undertaken. He built his house on a knoll in the woods on one of the high points of the locality. When he went there it was almost as nature had left it. The ground was broken by numerous hollows and ledges, so that much blasting had to be done in order to bring about a gracefully undulating surface. The place is the reverse of formal, and it would be a difficult matter to make it so. The advantages of such a splendid location have been fully made use of, and with progressive spirit and foresight characteristic of the owner, and under the able guidance of his father, Mr. H. H. Hunnewell, it will ultimately become one of the finest estates in New England, where a thoroughly natural style of gardening may be seen. The grounds are approached by a beautiful drive nearly half a mile in length, following to some extent a natural valley. The gradients are steady, but not steep. Where any cutting has been done it has been carefully graded, so as to be scarcely noticeable, and planted with shrubs and trailing plants, but not in a way to suggest anything artificial. The drier ledges are gradually being covered with suitable plants, including *Yuccas*, *Sedums*, *Sempervivums* and some alpine plants.

At the entrance to the drive there is a notable piece of old-fashioned stone wall built by the owner's grandfather, and it is in good condition to-day. It is valued as a remnant of old times, and the approaches are made to conform with it. The place is entered through a cutting, and there being little to suggest our approach the effect is most pleasing when it first opens.

The natural soil is scanty, but of good consistency, and rests on a clayey subsoil. The grading has been tedious and costly, as the ground is full of stones, interspersed with boulders of the large size. Some weighing as much as fifty tons have been moved and judiciously placed. Here and there through the trees a glimpse of these imposing and interesting features of the landscape is had. When fortified to the depth of a foot or more the soil is of the best possible composition for trees and shrubs of all kinds. Belting the wooded background there is already a fine collection of ornamental foliage and flowering shrubs. There has been a splendid show of bloom this spring. All the shrubs are growing rapidly, and already give a finished appearance to the place. For the quickest and best effects new places should be begun in this way. The planting of coniferous trees, shrubs and evergreens in general can be better done later. With these results come slowly, and much thought is required to properly formulate a plan with a view to effects later on. Many landscapes are utterly ruined

by improper planting. A desire for immediate effects is in nearly every case the cause. The artist is not always to be blamed. Generally, when he hands over the place to the owner, his responsibility ceases. But it should not. As the trees and shrubs grow they need frequent thinning out. Practical advice should be from time to time sought with regard to what is best to remove and what best to leave.

The area available is beyond all needs. The north side of the residence is scarcely touched. Here, no doubt, there will be formed an extensive collection of evergreens, ornamental as well as flowering. For alpine plants there are unlimited possibilities. Thus far the flowering and ornamental foliaged deciduous shrubs have been arranged in groups composed, in the main, of allies. Considered with regard to effect, nothing is lost, while for comparison and selection one has an excellent opportunity to judge of their various merits. The *Viburnums* are together. They afford wonderful variety. *V. opulus sterilis*, the Snowball-tree, or Guelder Rose, is their most familiar representative. It is a remarkably handsome shrub where it succeeds well. Weighed down with pendulous heads of the large-rayed sterile flowers, it is a striking object. Scarcely less beautiful is the type when loaded down in the autumn with bunches of large red berries. This is known as the Cranberry-tree. Equally handsome is *V. plicatum*, the Snowball-tree of Japan. The flower-heads resemble those of the Guelder Rose, but are erect, and the habit of the plant is more rigidly spreading. *V. plicatum tomentosum* is known as the fertile form, and is also a beautiful shrub. Conspicuous in this group is *V. latanoides*, with large, oblong, prominently veined woolly leaves. *V. cassinoides* has handsome shining olive-green leaves and umbels of Elder-like, sweet-scented flowers. *V. acerifolium* is distinct, with its Maple-like leaves. *V. Sieboldii* is a strong-growing kind with ribbed leaves and open umbels of white flowers. *V. prunifolium* has handsome Plum-like foliage.

Roses, although scattered through the place, are all represented in one group, and are remarkably healthy and free from insect pests. The rose-bug does not appear to thrive here. With us, in older gardens, it is often a question whether we shall disfigure our plants by the use of a multitude of insecticides, only to be partially successful, or give up their cultivation.

The Rose is a difficult genus when we come to examine the species and varieties; though often similar they may be distinct. *Rosa alpina* and *R. blanda* appear almost identical to a casual observer. To distinguish them when in leaf it is necessary to examine the bark. *R. blanda* is unarmed, except on the young shoots, while in *R. alpina* the prickles are scattered all over the bark, almost to the ground. *R. Carolina* is locally native. *R. lucida* has broad, shining foliage and deep pink flowers. The Burnet, or Scotch Rose, *R. spinosissima* is among the most beautiful. The stems are so densely covered with reddish spines as to give the whole plant a bronzed hue. Its large white flowers are produced in the greatest profusion, so that bushes of it, wherever seen, are conspicuous objects. *R. spinosissima grandiflora* is a well-named variety, somewhat larger in all respects. *R. foliolosa*, a charming little Rose from Texas, has bluish or sometimes pure white flowers. The blooms are large for the size of the plants and very fragrant. It comes into bloom later, as does *R. nitida*, with striking bronzed foliage and reddish pink flowers. *R. multiflora* will soon be a cloud of bloom, to be succeeded later by a profusion of bronzy hips. The Prairie Rose, in soft colors, is opening its large buds and will continue in bloom until late; while that giant among Briers, *R. rugosa*, the earliest and the latest, continues to bloom abundantly.

A few other flowering shrubs are worthy of special note. There is now a gorgeous display of *Kalmias*. These do better here than anywhere I have seen them. There are many hundreds, in all sorts of positions. They appear to do best on northerly exposures. *Ligustrum Ibota* is a hardy and most graceful Japanese Privet, worthy of general cultivation.

Herbaceous plants have not been neglected, and for the most part are kept by themselves, as they should be. They do well enough associated with shrubs for a while, in new shrubberies, and make pretty effects. As the shrubs increase in size and extend their root-area, it becomes harder to keep herbaceous plants in good health. The roots of the shrubs drain the borders of all moisture. *Dictamnus Fraxinella* is a strikingly handsome member of the Rue family and is here represented by a large group. *Pæonies* in another place, Yellow Foxgloves, *Digitalis ambigua*, and the common kind, *D. purpurea*, are always beautiful. *Lilium Hansonii* is showing up well. There are Day Lilies of several kinds and none handsomer than the old *Hemerocallis flava*. H. Mittendorf-

fiana, with orange-yellow flowers, adds variety, and later, all through the summer months, the handsome *H. Thunbergii* will continue to bloom. A fine group of *Lupinus pollyphyllus* shows what a handsome border plant it is. Trollies, Poppies, Larkspurs and Columbines add to an already fine collection, with hosts of others to follow in succession for the remainder of the season.

Wellesley, Mass.

T. D. Hatfield.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—A vigorous and beautiful shrub at Rose Brake is a *Fontanesia* which was bought for *F. phyllæroides*. This shrub or small tree is described as weeping in habit, but our specimen is a young tree, tall and straight, with handsome narrow leaves and no tendency of the limbs to grow downward. It is about six years old, twelve feet in height, and has small yellowish flowers in clusters. It is possible that this *Fontanesia* is of erect habit while young, and that the branches droop when the tree or shrub has attained maturity. It seems to be a rare plant, as I can find no account of it in the botanies I possess.

This year we have our Cannas in a large round bed about a tall clump of *Arundo donax*, which grows with us to the height of twelve feet. Groups of *Yuccas* stand near. Three varieties of these beautiful plants are now in bloom. *Yucca flaccida* was the first to open its flowers, but the more common *Y. filamentosa* attains the largest size here. Sometimes the flower-stalks measure seven feet in length. The blossoms look a little dull by daylight in contrast with the pure white *Madonna Lilies*, but seen on a moonlight night they have a beautiful pearly lustre which is like that of no other flower, and this gives them an indescribable grace and charm. *Y. recurva*, *Y. angustifolia*, *Y. filamentosa* and its variety *flaccida* are perfectly hardy here. So also is *Y. stenophylla*, which has not yet bloomed for us. *Y. superba* lives, but does not grow very fast and does not flower. It is protected by a covering of dead leaves in winter.

Cedrella sinensis, planted in this semi-tropical shrubbery I am describing, in company with *Aralias*, *Paulownias* and a beautiful Japanese *Acacia*, is now a tall, symmetrical young tree, more refined and elegant in appearance than the *Ailanthus*, which it resembles. It is twenty feet in height, eight years old and has not bloomed. Neither has the Japanese *Acacia*, which is labeled *Acacia Nemu*, ever given us a flower, although it is older than the *Cedrella*. It is described as bearing rosy flowers, but I suppose our climate is too cold for them, although the tree stands our winters without protection.

Sassafras bushes are so ornamental that we think them worthy of a place among the handsomest exotic shrubs. We have two or three of them in a group near our Japanese Maples, and there is a charming rivalry between them. Sometimes I think the *Sassafras* bears away the palm for variety and beauty of color in the new growth. Then the odd shapes of the leaves, the erect habit of growth, the tender coloring of the young shoots and the refreshing aroma of the whole plant make it one of the most desirable of our native trees. It should be planted for its rich coloring in the fall, as well as for its vernal beauty.

Shepherdstown, W. Va.

Danske Dandridge.

Recent Publications.

The first annual report of the Chief Fire Warden of Minnesota, appointed under "an act to provide for the preservation of the forests of the state and for the prevention and suppression of forest and prairie fires," approved April 18th, 1895, has been published. Under the act as quoted above the supervisors of towns, mayors of cities and presidents of village councils are constituted fire wardens. The chief fire warden may appoint fire wardens, and in case the fire force of any locality is inadequate to prevent or suppress forest fires he may appoint temporarily additional fire wardens. It is the duty of the fire wardens to post placards containing an abstract of the penalties proposed under the act, to prevent, if possible, the setting of forest and prairie fires, and, as far as practicable, to control fires. For this purpose they may call to their assistance any able-bodied male person over eighteen years of age. They must coöperate with the fire wardens of adjoining districts, and, in the absence of these, may direct the work of control and extinguishment of forest fires outside their own districts.

They are obliged to arrest without warrant every one found violating any provision of the act and to make complaints against such persons before a magistrate.

Under the act companies operating railroads within the state of Minnesota are obliged to use efficient spark-arresters on all locomotives, to keep clear of all combustible materials their right of way to the width of fifty feet on each side of the centre of the main track, to prevent their employes from leaving fire or live coals or hot ashes in the immediate vicinity of woodlands or lands liable to be overrun by fires. Engineers, conductors or trainmen who may discover that fences and other materials along the right of way, or that woodland adjacent to the railroad are burning or in danger from fire must report the same promptly at the next telegraph station that they may pass. In dry seasons railroad companies must give particular instructions to their employes for the prevention and prompt extinguishment of fires, and must cause warning placards to be posted at their stations in the neighborhood of forest and prairie grass lands. They must concentrate such help as shall be available to effectively extinguish fires occurring along the lines of their roads.

The State Auditor is made Forest Commissioner, with authority to appoint a deputy to be known as Chief Fire Warden, who is entrusted with the enforcement of the provisions of this act. The Chief Fire Warden has general charge of the fire warden force of the state and may appoint temporarily fire wardens for any territory. He may incur an expense not exceeding \$5,000 in any one year for special assistance to prevent or suppress fires during periods of peculiar danger. It is made his duty to investigate the extent of the forests of the state, with the amounts and varieties of the timber contained in them, the damages done to the forest by forest fires, the causes of such fires, the methods used to promote the regrowth of timber, and any other matters of interest relating to the forests. This information, with his suggestions, shall be included in a report which he is to make annually to the Forest Commissioner. The salary of the Chief Fire Warden is \$1,200, and each fire warden receives for his actual services \$2.00 a day. Men called on in emergencies to assist in extinguishing fires are to receive \$1.50 a day. Two-thirds of this shall be paid by the company where the service is performed and one-third by the state. No county is allowed to expend more than \$500 of public money in any one year under the act.

The first annual report of the Chief Fire Warden treats of the organization of his service, a list of the fire wardens of the different counties, general directions for the extinguishment of fires, a report on the forest and prairie fires of 1895, in which it appears that in an aggregate area representing about six million acres of prairie country there were during the year, according to the report of fire wardens, one hundred and five fires, which burnt over about 73,000 acres, while only about 8,000 acres of forest were burnt over, with an estimated damage of only \$1,325. A considerable space is devoted to the remarks of the fire wardens on forest fires, and this part of the report might, perhaps, have been reduced in bulk by more careful editing. An account is given of the Minnesota forests, with the amounts and varieties of the wood and timber growing in them by counties. The methods and importance of the logging industry are touched upon, with replies from a number of lumbermen relative to existing methods of lumbering. The regrowth of White Pine and the utility of forests are discussed. The statement of expenses shows that only \$2,020 were expended during the year in this serious effort at forest preservation. The report, which contains one hundred and eighty-eight pages and is accompanied by a forest map of Minnesota, will be found of special interest to every one interested in checking the destruction of property through forest fires.

Notes.

A large tanning establishment has recently been erected at Astor, Florida, for the purpose of utilizing the tannic acid contained in the roots of the Saw Palmetto, *Serenoa serrulata*, for

tanning leather. This tannery, which is furnished with eleven large tanks, is said to have capacity enough to tan all the hides produced in Florida.

During June 520,000 bunches of bananas were sold at wholesale in this city, 16,000 bunches more than were imported in the same month a year ago.

The United States Consul at Havre, France, recently sent home some samples of new textile fabrics which were exhibited at the State Department in Washington. They were woven from the fibres of peat, which, as they proved, can be bleached to whiteness and will then take any dye. These fabrics are said to be especially advantageous from the fact that they have antiseptic qualities which will prevent them from harboring disease germs.

Professor R. L. Watts, the horticulturist of the Tennessee Agricultural Experiment Station, has written a short treatise on Onion-culture, which has been published as a farmers' bulletin by the United States Department of Agriculture. It is one of those useful little monographs which the department is issuing from time to time, and which are very successful in selecting the important phases of a subject and treating them thoroughly, and yet concisely and in a practical straightforward way, which cannot but be helpful to any careful reader.

We have spoken in another column of the value of the hybrid *Philadelphus Lemoinei* as a flowering shrub in this country, and we have just received a note from an English correspondent who states that masses of this shrub were among the most attractive features of Kew Gardens in the middle of June. The plants were set in large groups, and although they were no more than two feet high they were covered with their white and fragrant flowers, while the light-colored foliage makes them attractive all the summer through.

At a wood-pulp mill at Elsenenthal, in Austria, a trial was recently made to show how quickly living trees could be converted into newspapers. At 7.35 o'clock in the morning three trees were felled. By 9.34 the wood had been stripped of its bark, cut into suitable pieces for the mill, converted into pulp and pressed into paper. Then it was passed from the factory to a neighboring printing-press, and the first printed and folded copy of the journal was ready for perusal at ten o'clock, just 145 minutes after the axe had been laid to the standing trees.

Bulletin No. 1 of the Geological and Natural History Survey of the Chicago Academy of Sciences is devoted to an account of the Lichen flora of Chicago and vicinity, by William Wirt Calkins. It is the initial number of a series of publications in which the Chicago Academy of Sciences proposes to discuss the botany, zoology and geology in the neighborhood of Chicago. The area which it is proposed to include in the survey is about fifty miles square, leaving, after deducting the water-covered portions, nearly 1,800 square miles, and comprises all of Cook and Du Page counties, the nine northern townships of Will County and a portion of Lake County, Indiana.

The famous Great Tun long shown to tourists in Heidelberg Castle, in Germany, and hitherto the largest in the world, is greatly exceeded in size by one recently constructed on the St. George Vineyard, at Fresno, in California. This cask is thirty feet in height and about twenty-six in diameter and holds 79,000 gallons of wine, while the Heidelberg cask holds about 42,000. It is built of redwood obtained from the forests of Humboldt County. The lumber required would have sufficed to build a large house, and two car-loads of steel hoops were needed to bind the immense staves together. As these had to be absolutely free from flaws of every kind, not one piece of timber in ten was found perfect enough for use.

Cork has been tried as a paving material in Vienna and London with much success. It is granulated, mixed with mineral asphalt and other cohesive materials, and compressed into blocks of suitable size, which are embedded in tar and rest upon a concrete foundation six inches in thickness. The advantages claimed for cork pavements are cleanliness, noiselessness, elasticity, durability, moderate cost and freedom from the slipperiness which, in wet weather, makes asphalt pavements undesirable. Moreover, unlike wooden pavements, they are non-absorbent, and therefore inodorous. Samples taken from a London street near the Great Eastern Railway station, where traffic is very heavy, had been reduced in thickness by less than one-eighth of an inch after being in use almost two years.

Professor Lucius Marcus Underwood, at present Professor of Botany in the Mechanical and Agricultural College of Ala-

bama, has been appointed to the position at the head of the botanical faculty of Columbia College in this city, recently resigned by Professor Britton when he was offered the post of director of the city's new Botanical Garden, and now made Professor Emeritus. Professor Underwood has particularly devoted himself to the study of cryptogamic plants, and is an authority on the Ferns and their allies and on several groups of fungi. Previous to his appointment to the chair he now fills he had been Professor of Botany at Syracuse University and at De Pauw University. He represented the United States at the international botanical congress held in Genoa in 1889, has been vice-president of the botanical section of the American Association for the Advancement of Science, and has published numerous botanical papers. He will begin his work at Columbia in the autumn.

A large consignment of fruits from Victoria was exhibited not long ago in London. There were apples of many sorts, all in good condition, together with pumpkins, custard-melons and pineapples. Some of the English papers seem to be especially exasperated at the fact that the English markets should be filled with apples when the home-grown fruit is said to be the best in the world, and it is recommended in a leading paper that the Chambers of Agriculture should send out half a dozen men to study the system of fruit-growing pursued in Canada, the United States and Australia, so as to instruct English fruit growers against such injurious competition. But no amount of instruction would help English farmers to grow custard-melons and pineapples at home, while early winter and late autumn apples are not to be found in June except in the southern hemisphere. No doubt, English fruit growers can improve on their methods, but they never can grow enough fruit for home consumption, and it ought to be a matter of self-congratulation in England that her commercial relations and facilities are such that she is able to get the best of fruits from her colonies and elsewhere all the year round.

It is well known that fermentation of different kinds is due to the action of certain yeast-plants, and that different plants give different results. In butter-making, for instance, it is now the practice to cultivate in marketable quantities the varieties of ferments which will give the best quality and flavor to butter. It has been proved, too, that the bouquet of different wines depends largely on the ferment which develops in the juices of the grape, so that there are many distinct wine-yeasts cultivated and sold, the different varieties giving special bouquets to the wines in which they are used. More recent experiments show that the best of the wine-yeasts can be used in the fermentation of cider and the juice of berries, so that it is said to be possible to make a wine from cider which possesses the bouquet of Rudesheimer. At the recent horticultural exhibition at Berlin one of the most interesting exhibits in the scientific section was a collection of these clean yeast-cultures in gelatine, as well as of the injurious yeasts and microphotographs of both. Since the keeping quality and flavor of the wine both depend so largely on the quality of the yeast which brings about the fermentation, these microscopic plants have assumed great importance in agricultural economy.

An interesting bulletin has just been issued by the Rhode Island Experiment Station on Apple Culture, which has received a new impetus in that state since the spray pump has been used as a means of warfare against pests, so that neglected orchards in that region are now being pruned and fertilized until they have become productive and valuable. Apple-trees have come to be regarded as cultivated plants which must be regularly supplied with food, and since the roots extend wide as well as deep it is found necessary to apply fertilizers over the entire space where they spread. Apple-trees need much moisture, and when this is lacking the fruit falls unripe and the winter varieties decay prematurely. Mulching is essential, and if the tops of the trees are allowed to shade the ground and prevent the free movement of air currents over the roots during drought the value of the mulch is greatly increased. The form of the tops in different varieties naturally differs, but all need a large leaf area exposed to the light if good crops are expected. The Greening, for example, forms a more spreading top than the Baldwin or Roxbury Russet, but the limbs of the last two droop to the ground in mature trees. Strong light promotes the formation of the fruit-buds, and the interlacing of the branches of adjacent trees is unfavorable to their formation, a fact which is graphically illustrated by pictures of twigs grown in the sunlight and in the shade. Directions for combating the various fungi and insects are full and complete, and it is suggested that poultry can be used to good advantage against the apple maggot. Altogether this is a valuable paper.

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English Gardens Unsuitable for America.

WE spoke last week of the energetic plea made by Mr. R. Clipston Sturgis in *The Cosmopolitan* for a change in our current methods of planning and planting the grounds of suburban houses. We plan them rather for display than for use, and we secure neither beauty nor convenience. We leave them unshielded by walls or hedges; we provide them with no sheltered umbrageous spots for repose and domestic or friendly intercourse out of sight of the passers on the road; we furnish them with no vegetation whose care and enjoyment may foster a love for nature. Our suburban places are, therefore, monotonously alike and generally ugly. They lack individuality, they have no homelike atmosphere, and they lose their rightful effect in forming home-loving habits. We practically make them a part of the public street, and therefore those who own them live indoors or seek their pleasures away from home.

There is need, indeed, for a radical change in our ideals of what a small suburban place should be, but the right ideal for American adoption is not suburban gardens like those of England. Mr. Sturgis illustrates his article with a plan and some pictures of an actual English suburban place of four acres. It stretches away from the high road in a long and relatively narrow rectangle. The house stands close to the right-hand boundary line, separated from the road in front by narrow, but dense, plantations and a curving entrance-drive. To the left of it lies a formal garden. Back of it is a large lawn for tennis and croquet, and back of the formal garden is another lawn surrounded by flower-beds. Beyond these are two smaller lawns, one of them encircled by flower-beds again, and all these lawns are defined by hedges. Then across the whole width of the place stretches a plantation of large trees, irregularly disposed and broken by little open glades, and hidden by these, at the rear end of the place, are the stables and a kitchen garden. All the paths are straight except where they wind through the plantation of large trees. The approach to the stable runs close to the boundary line, passing the kitchen entrance of the house under a range of great Elms, while the opposite border of the place

is likewise protected by trees overshadowing a straight foot-path.

This is an excellent design of its kind. Perhaps, in a four-acre place, the average American would prefer less formality and more naturalness of effect. But this is a matter of taste, to be largely determined by the character of the surroundings of the place, the modeling of its surface and the vegetation it bears. And certainly Mr. Sturgis is right when he praises an arrangement which, putting the house in one corner of the grounds and the stable in another, and cutting them with no obtrusive lines of gravel, leaves all their planted portions an unbroken whole, to produce the full effect possible with such dimensions. Our usual American plan of setting the house exactly or nearly in the middle of its grounds is the worst that could be imagined, destroying all possibility of either unity or breadth of effect in their disposition. Two and two are not equal to four in gardening art. If this English house had been placed in the middle of its four acres neither half of the grounds would have looked one-third as large as the whole place must appear to-day.

But in considering places like this as models we should note the fact that American are unlike English conditions, and especially so in two important ways—namely, the price of labor and the character of the climate. A suburban place covering much less ground than four acres may, indeed, be made charming and private and homelike by an intelligent arrangement of trees and shrubs, fruit-trees and kitchen gardens, lawns and hedges and flower-beds. But such a place needs a large amount of persistent and skillful care. Even the clipping of the grass, when it is cut up into many narrow borders, is time-consuming labor. And flower-beds in a climate like ours, very hot and often very dry, must be sedulously tended, or they quickly become distressing instead of pleasing to the eye. In England labor is cheap; in America it is very dear. The majority of our suburban householders cannot afford to keep a skilled gardener. At the most, they keep only an "all-round man," who divides his time between the horse and the household chores and the garden. Very often they depend upon a peripatetic gardener for such occasional days or hours of attention as their gardens imperatively require. And many of our readers must have sad memories of the difficulty of obtaining the aid of this person in suburban districts or rural villages.

But, it may be said, the members of the family should care for their gardens themselves. English people do this to a very great extent. English women especially seem born with a love for gardens, a passion for flowers, and count no time or trouble too great to bestow upon them. Such work is physically wholesome and mentally wholesome, too. If our gardens were planted in the English way, so that privacy would be secured to those who labor in them, our women and girls would be better employed in caring for them, during a part of the day at least, than in swinging in hammocks or promenading the streets, or even in driving ponies or riding the seductive bicycle, if only the American climate were like the English. English women live in a temperate clime. We live in a land which is almost arctic in winter and almost tropical in summer. When the sun shines in England, even in July or August, it gives out a moderate, supportable heat. Upon us it shines with scorching force even in those early weeks of spring when the hardest part of gardening work must be accomplished; and any one who has attempted gardening work knows that to stand and stoop and potter about in the hot sunshine is even more exhausting than to walk or to ride a bicycle, or to play tennis beneath it.

Then the moisture of England facilitates Nature's gardening processes to a degree of which the untraveled American can hardly conceive. And the long northern twilights give a chance for leisurely, comfortable gardening wholly denied us by our swift-coming darkness. This latter fact is of much significance in one direction. It especially affects the outdoor possibilities of the men of

the family. After the longest day's work the Englishman has time for games of tennis before dark, and for much lingering among his plants; and it is in these twilight hours, when the father is at home, yet when outdoor pleasures are still possible, that the domestic life of the English suburban family of the middle class is seen at its best. In short, the English climate helpfully smooths the path of the amateur gardener, but the American climate puts many steep difficulties in his or her way. Almost every Englishwoman takes instinctively to gardening as soon as she has the chance, while only an occasional-born enthusiast tends her own plants in America. But if the women were to change places, their characteristics in this respect would pretty surely be exchanged. It is a difference in climate more than in natural tastes and aptitudes which makes the contrast that every one notes to-day.

The conclusion of the matter is that the rich man, in America as elsewhere, may dispose his garden pretty much as he pleases, but the man who must count cost, while he may have a garden as beautiful as any Englishman's, and as secluded and protected, should plan it in a different manner. He should plant such things as will produce the greatest possible amount of beauty with the least possible amount of care. He should not screen his garden with hedges, which need much attention, are apt to suffer from our hot winter suns, and are with difficulty repaired when a break in them occurs. Rather, he should build a light paling of iron or wood and cover it with hardy vines which can be easily renewed if disaster overtakes them. Thus he will secure protection in summer when he wants to live in his garden, and in winter, when he can no longer live in it to the same extent that the Englishman may, its snow-clad charms will be partially visible as a refreshment to the eyes of passers in the street. He should keep his spaces of grass compact and simple so that they may be cut and watered with the least possible expenditure of time and skill. He should put his tennis-lawn, if possible, in some retired spot, for in a hot American summer it will be quickly worn into shabbiness. He should plant such trees and shrubs as will best withstand our fierce alternations of heat and cold, and such, again, as will need the least amount of care. And his flowers should, for the most part, be such as will come up year after year without the gardener's coaxing, while he should so dispose them along the borders of his shrubberies or palings that, if they grow a little wild, they will not strike a discordant note or look like things deprived of the care that is their due. As to fruit-trees and vegetable gardens, he may better dispense with them and trust to the neighboring shop or commercial garden unless he is a true enthusiast or is sure of ample assistance to keep them productive.

As much seclusion, as much variety, as much beauty may be produced in this way as with English methods of planting. Fitting places where children may play, and where their elders may lounge or read, or talk with their friends protected from intrusive eyes, can easily be provided. An abundance of shade can be secured, and an abundance of floral color and gayety; for our land is particularly rich in those flowering shrubs which surpass any flower-beds in grace and charm of effect, and need no attention save an annual pruning. A place intelligently planted with hardy shrubs and creepers may be rich in color from end to end of the year, even though it contains no smaller flowering plants. But these, too, may easily be had in kinds which need little attention and which, beginning with the bulbous plants of early spring, will keep up their brilliant harvests until the frost kills the last Golden-rods and Asters. The true American type of suburban garden, varying from half an acre to three or four acres in extent, has yet to be evolved. When it is evolved it will excite the wondering admiration of even the English visitor. It will be created and cared for at comparatively little cost. It will make the towns where it is many times repeated widespread bowers of perpetually changing interest and charm; and it will make of each home a truly

homelike spot, attractive enough and individual enough to lay strong hold on the affections of the children who grow up within it, natural enough to foster their love for Nature in her loveliest forms, and yet protected enough to give them full opportunities for the development of united, home-keeping, truly domestic habits of life.

Plant Names of Indian Origin.—III.

IPECACUANHA (abbreviated to *Ipecac*, and with variants: *Picac*, *Peca*, *Hippo*, etc.)—A name for several North American plants, of which the roots, like those of the officinal *Cephaelis*, possess emetic properties (*Podophyllum*, *Euphorbia*, *Gillenia*, etc.) The word *Ipecacuanha* is derived, though Portuguese, from Tupi (Brazilian) *ipé-caa-goéne*, meaning, literally, "roadside emetic plant."

KINNIKINNICK (*Arctostaphylos Uva-ursi*, *Cornus sericea* and *C. circinata*).—A word belonging to one of the Northwestern Algonkin dialects (probably *Odjibway*), and meaning "that which is mixed." The word is used with reference to objects of different kinds mixed in a dry state, and by hand, as implied by the "characteristic" *n* preceding the verbal suffix. The name is applied by the Indians to a mixture of two-thirds tobacco and one-third sumac leaves (gathered when they begin to turn red), or inside bark of *Cornus sericea*. The preparation varies, however, in different localities and among different tribes, the proportion of tobacco sometimes being not more than one-fourth. Our Indians early discovered what it took modern chemists and medical men long to find out, namely, that vegetable substances of an astringent nature (due to tannin) have the property of de-nicotinizing tobacco, thus depriving it of its poisonous principle and preventing its injurious effects upon the nervous system. All the plants used for mixing with tobacco abound in tannin. The word is sometimes spelled *Killikinnick*.

KOUSE, or **KOUSE-ROOT** (*Peucedanum ambiguum*).—From *kowish*, the Nez-Percé (*Shahaptian*) name of the root, which is used by these and other Indians for making bread.

KNACKAWAY (*Ehretia elliptica*).—A corruption of Mexican-Spanish *anagua*, shortened from *anacahuite*, which is from Aztec *nanahuacahuil*, "lues venera tree," so called from the medicinal use of the roots.

LENNIKBI (*Liriodendron Tulipifera*).—A name erroneously transferred by herbalists, herb doctors and herb dealers from *Tilia Americana*. The word is Delaware (*Algonkin*) and means "the true tying-bark," "the tying-bark par excellence."

MAHOGANY (*Swietenia Mahagoni*).—From Taino (Carib dialect of Hayti) *mahagoni*. The name has been extended, with various specific epithets, to one or more species of several genera of trees, such as *Betula*, *Gymnocladus*, *Persea*, *Cercocarpus*, *Catalpa* and *Rhus*.

MAIZE (*Zea Mays*).—From Taino (Haytian Carib) *mais*, or *mahiz*.—As Dr. J. R. Bartlett remarks: "The word is never used in common language in the United States. Indeed, few would understand it."

MAYCOCK (*Cucurbita Pepo*).—From Powhatan (*Algonk*.) *macock*, or *mahcaug*, "a fruit like unto a muskmillion, but lesse and worse" (*Strachey*). "*Macóquer* [plural], according to several forms called by us *Pompions*, *Mellions* and *Gourdes*, because they are of the like formes as those kinds in England" (*Harriot's Briefe and true report of the new found land of Virginia*: 1585). "Their *macocks* are a sort of *Melopepones*, or lesser sort of *Pompions*. Of these they [the Virginians] have a great variety, but the Indian name *macock* serves for all, which name is still retained" (*Beverly's Hist. Virginia*, p. 27). Professor Schele de Vere (*Americanisms*) notes that the name is still in use. The name is the equivalent of the Delaware *machgachq*, "pumpkin," and of *Odjibway*, *mahak*, "box," "chest," "barrel"; Cree, *makkak*, "barrel," "cask," etc. The word means "that which covers"; from the root *ak*, "to cover," with the impersonal prefix *m*, used for forming an appella-

tive from a verbal root, and the inanimate participial suffix *k*. The name alludes to the hard rind or shell (*hack*). Strachey gives the diminutive form *macaugs* as the name for grape-stone, or plum-stone, and *maucauwins* ("little maucau") as the name for a bell, the European bell probably having been likened by the Indians to a gourd rattle.

MAY-POP.—A name for the fruit of *Passiflora incarnata*; altered from maycock (obsolete), a corruption of Powhatan (Algonk.) *maracock*, "a fruit by the naturalls so called" (Strachey). Dr. J. Hammond Trumbull thinks that inasmuch as our *P. incarnata* is so like *P. edulis*, the home of which is in Brazil, that botanists have been unable clearly to distinguish between the two, "we may infer that the fruit and its name were originally derived from the same South American source" (*Amer. Jour. Sci.*, xxvi., 130). According to this view, maracock would be ultimately from the Tupi name *mburucuia* (meaning "fruit of a vine"), which Marcgrav wrote *maracuia* and *murucuia*, and which was adopted in the form *merécuya* by the Caribs of the Lesser Antilles, by way of which the fruit, with its Tupi-Carib name, would have reached the country of the Algonkins before the arrival of the Europeans.

MESQUITE (*Prosopis juliflora*).—There are many variants of this word, such as Meskit, Mesquit, Mezquit, Mezquite, etc. The name is, through Mexican-Spanish, from Aztec, *mizquitl*, which, according to Hernandez (*Rerum Med. Nov. Hispan. Thes.*), was originally the name of the sweet edible pod. The word cannot be referred to any Aztec root, and may have been borrowed, possibly, from Araucanian *mizqui*, or Kechua *misqui*, both meaning "honey," or anything "sweet" (one of the English names of the tree is Honey-pod.)—The name, with various qualifying adjuncts, has been applied to several grasses that abound on the prairies among the Mesquite-trees.

NOPAL (*Opuntia Engelmanni*).—A Mexican-Spanish name for the plant in Texas, from *nopalli*, a term generic in Aztec for Cactus-plants.

NENDO, or NONDO (*Ligusticum actæifolium*).—A name said by early writers to be from the language of the Virginia Indians. The statement is somewhat indefinite, as there were several different Indian languages spoken in the extensive territory known under the general name of Virginia. The word cannot now be traced.

PAPAW, or PAWPAW (*Asimina triloba*).—A name, says Dr. Gray in his *North American Genera*, doubtless given to the fruit from a fancied resemblance in its appearance or taste to the true Papaw of tropical America, the name of which is, through Spanish, from Taino (Carib of Hayti) *ababai*.

PECAN (*Hicoria Pecan*).—*Pagán* or *pakán*, signifying that which is "struck" or "pounded" with an instrument in order to crack it, is the Algonkin general term for hard-shelled nuts. To the Illinois Indians, the fruit of *H. Pecan* was the *pakán* par excellence. From them the early French settlers in Illinois and Louisiana borrowed the word in the form *pacane*, whence the English name of the nut.

PEMBINA (*Viburnum oxycoccus*).—A French-Canadian corruption of Cree (Algonk.) *nipiminán*, meaning "water-berry."

PERSIMMON (*Diospyros Virginiana*).—This name, from the time of the earliest settlers, has been variously spelled: pushemin, pichamin, pessemmin, putchamin, puchamine, parsemena, persimena, pissmien, putchimom, pitchumom, phishimon, persimon, possimon, pishamin, parsimmon and persimmon. The last-mentioned orthography, the one now adopted, was first used in 1669 by Shrigley. As stated under the word Chinquapin, the suffix *men* means "fruit." The prefix, varied push, pers, puch, poss, etc., is susceptible of several interpretations, but I think that it can be safely referred to the Algonkin root *pos*, varied dialectically to *pash* and *pes*, meaning primarily "to penetrate," whence the twofold meaning of "to fill up" and "to choke." The word would thus, in its original form, have meant "choke-fruit," a very apposite name in view of the nature of the berries, which, when not fully ripe, are, as Strachey ob-

serves, "harsh and choakie, and furre in a man's mouth like allam."

New York.

W. R. Gerard.

Foreign Correspondence.

London Letter.

RIGIDELLA IMMACULATA.—A group of seedling plants of this interesting Irid is now in flower in a sunny greenhouse at Kew. Although introduced into cultivation by Hartweg over fifty years ago from the mountains of Guatemala, it does not appear to have won favor as a garden plant, notwithstanding the rich color and elegant form of its flowers. In habit the plants suggest Tigridias, the leaves being erect, ensiform and plaited; the scapes are a yard high, branched, with clusters of green folding spathes from which are pushed the drooping rich crimson flowers composed of a campanulate cup an inch long and three reflexed segments nearly as long again as the cup. The flowers are fugitive, but they succeed each other rapidly. Only two species of *Rigidella* are known, the other being *R. flammea*, a native of Mexico, which, according to Mr. Baker, is larger in flower than *R. immaculata*. To cultivators of choice bulbous plants this plant may be recommended on account of the form and brilliant color of its flowers.

IRIS ROBINSONIANA.—A figure of this, the largest of all species of *Iris*, was published in *GARDEN AND FOREST*, vol. iv., p. 352, from a plant flowered at Kew in that year. The same plant is now in flower again. It bears twelve spikes, each about eight feet high, the first flowers opening on May 21st. More than one thousand flowers had been developed since that time, the highest number open on any one day being 113 on June 13th. The flowers last only one day, but there are some open every day. Each flower is about four inches across, pure white with blotches of golden yellow at the base of the three largest segments. Even when not in flower this *Iris* is as ornamental as the New Zealand Flax, *Phormium tenax*. It rarely flowers under cultivation. I attribute its present floriferousness to its having been lifted in March last and replanted in fresh soil, the check thus given, no doubt, having induced the development of flower-scapes. The species is a native of Lord Howe's Island. It requires a sunny position in a warm greenhouse and plenty of water at all times.

MARICA CÆRULEA.—This is by far the handsomest of the dozen species of *Marica* admitted by Mr. Baker, but it is rarely met with in cultivation. At Kew it is grown along with the Agaves in a warm, sunny greenhouse, where it is planted out in gravelly soil. Here it forms a tuft of ensiform leaves a yard long, and in early summer develops numerous scapes five feet long, bearing clusters of flowers near the apex. These open in slow succession; they are four inches in diameter and of a rich blue color with lines of yellow, brown and white at the base of the outer segments. On some days the display of flowers is rich and delightful. I believe this species is naturalized in Jamaica, and, according to Mr. Baker, it has been found in west tropical Africa, although it is a native of tropical America. When grown in pots it is not nearly as satisfactory as when planted in a bed of gravelly soil, as above described; at any rate, I have never seen it anywhere so happy and floriferous as in the succulent house at Kew.

IRIS SIBIRICA.—All the forms of this *Iris* are easily cultivated, and they flower most freely in early summer. At Kew they are most effective when planted in masses on the margin of the lake, the moisture at the root evidently being to their liking. A few roots planted as an experiment three years ago have now become large clumps, which this month have been perfect sheafs of rich lilac-blue flowers. The white variety, called *flexuosa*, is rare in cultivation now, although one of the oldest of garden plants.

IRIS KEMPERL.—We have at last succeeded with this plant, a bed, or rather bog, about six yards square in one corner of a lake being crowded with large beautiful flowers.

We find that it is a mistake to plant it in a position where it gets flooded or submerged in winter. Some seedlings three years old grown in an ordinary border are also in flower. No Iris makes such a beautiful display as this, and we are indebted to the Japanese gardeners for a wonderful range of variation in color among the plants of it imported from that country. According to Mr. Baker its correct name is *I. lævigata*.

IRIS XIPHIODES.—The English Iris is one of the most valuable of all bulbous plants to use for early summer effect. It may be purchased for about three dollars a thousand, and if planted in beds on a lawn in September it grows and flowers as profusely as the freest of garden Tulips. In some gardens it becomes naturalized, and I have seen it come up among Potatoes, under Gooseberry-bushes and promiscuously in the flower-beds with all the persistency of a Dandelion. No Iris is more useful for cut-flower purposes and no Iris looks more beautiful when tastefully arranged in a vase. Every garden of any pretensions should have some beds of it. Almost equally valuable is the Spanish Iris, *I. Xiphium*, which has smaller flowers and blooms about a month earlier than the English Iris. In some of our big metropolitan gardens these two Irises are planted yearly in many thousands. They are so cheap that one need scarcely trouble to lift them where they are in danger of being hurt by cold or wet. At Kew they are lifted toward the end of July and covered with dry soil till planting time again.

DIMORPHOTHECA ECHLONI.—I noted this plant a few weeks ago as a new introduction of promise from south Africa, describing the flowers from collector's notes. Plants of it are now in flower at Kew, and these prove the flowers to be as large as those of the Paris Daisy, or Marguerite, white, with a dull purple disk and the ray-florets tinged with blue-purple on the under side. The partially opened flowers are pretty in their variegated appearance, and when fully expanded they are chaste and elegant. The plants are about a foot high, branched freely, clothed with obovate dark green fleshy leaves, and the flower-heads are borne on erect axillary scapes about nine inches long. Plants of it are flowering freely in a border out-of-doors and in pots in a cold greenhouse. The species is said to be a subshrubby perennial, but we do not know enough about it to be able to say if it will prove perennial under cultivation here. A figure of it will shortly be published in *The Botanical Magazine*.

RENANTHERA STORIEI.—Reichenbach described this as a new species in 1880, when it flowered for the first time in cultivation in the Clapton nursery of Messrs. Low & Co. It is a native of the Philippines, and in floral beauty it surpasses the beautiful Chinese *Renanthera coccinea*, which it resembles in habit and general appearance, differing in having wider sepals and petals, and in color, *R. coccinea* being uniform scarlet, while *R. Storiei* is crimson, with blotches of a darker shade, and yellow lines on the side lobes of the lip. A plant of it in flower was shown last week by Sir Trevor Lawrence; the spike was about eighteen inches long, branched, and it bore about fifty flowers, each two and a half inches across. A colored figure of *R. Storiei* was published in Williams' *Orchid Album* in February of this year, prepared from a plant flowered in the Holloway nursery. *R. Imschootiana* is a third species of similar character to the two above named. I described this in *GARDEN AND FOREST* in July last year.

DISAS.—About four hundred spikes of Disa-flowers are now a feature of the cool Orchid-house at Kew. They vary in length from a foot to nearly three feet, and in the number of flowers upon each from a dozen to twenty. *D. Kewensis* is the most beautiful, surpassing *D. Veitchii* in the rich rose-pink of the flowers, the shorter scapes and the much larger number of flowers upon each. *D. Premier* and *D. Langleyensis* are also first-rate garden Orchids. When grown as at Kew the two species, *D. racemosa* and *D. tripetaloides*, are good decorative Orchids. Mr. H. Bolus, the eminent Cape botanist, says these are much

finer under cultivation here than he has ever seen them in a wild state. They all require cool-greenhouse treatment, plenty of water, an open peaty soil and shade from direct sunshine. As soon as the plants have flowered they are shaken out of the soil, the suckers taken off and potted singly in small pots and watered liberally. In November they are again potted into three-inch pots, in which they remain until they flower. They make a display of flowers for about two months.

London.

W. Watson.

New or Little-known Plants.

Deutzia Lemoinei.

THIS hybrid between *Deutzia gracilis* and *Deutzia parviflora* was raised by Monsieur V. Lemoine, of Nancy, and was exhibited by him in April, 1894, before the French National Horticultural Society. *Deutzia gracilis*, which is a low shrub with slender branches, lanceolate leaves and short axillary racemes of white flowers, is a native of the mountain valleys of southern Japan, and is now one of the most popular garden shrubs, both in the United States and England, although in the northern states it suffers considerably from the cold of severe winters.

Deutzia parviflora (see *GARDEN AND FOREST*, i., 263, f. 57) is a native of northern China and Manchuria, and is a hardier plant than *Deutzia gracilis* and the most beautiful member of the genus which has been introduced into our gardens, where it grows to the height of three or four feet, with stout erect stems and compact corymbs of large white flowers. The hybrid which Monsieur Lemoine has succeeded in raising between the two very distinct plants by fertilizing the stigmas of *Deutzia parviflora* with the pollen of *Deutzia gracilis*, is nearly intermediate between them. The branches are stouter and more upright than those of *Deutzia gracilis* and more numerous and shorter than those of *Deutzia parviflora*. The flowers are about three-quarters of an inch in diameter and are borne in loose many-flowered panicles terminal on axillary leafy shoots, with pure white broadly ovate rounded spreading petals and reddish yellow stamens. Monsieur Lemoine has found that his new hybrid forces well and believes that it will supplant *Deutzia gracilis* for this purpose, as it surpasses it in beauty and floriferousness. At Nancy, where *Deutzia Lemoinei* has grown rapidly, it has proved very hardy, flowering in different soils and exposures.

Our illustration (see p. 285) is made from a plant which flowered last winter under glass in the Arnold Arboretum. Its value and hardiness in the open ground has not, we believe, been satisfactorily tested yet in this country.

Plant Notes.

ACANTHUS LONGIFOLIUS.—This plant, from southern Europe, has generally been treated as a greenhouse perennial, or, at least, when grown in this country it has been provided with the shelter of a cold frame during winter. So far as we are aware, it has not been treated as hardy until Mr. Cameron, of the Harvard Botanical Garden, two years ago left some strong plants where they had grown in the border during the summer, giving them no protection but a coating of Oak-leaves thrown about them after the ground became frozen. Every one of these plants lived through the winter and flowered beautifully last summer. Mr. Cameron writes that these plants are now in first-rate condition, with larger foliage and more numerous spikes than they carried last year, and the plant has once more proved that all it needs during the winter is a covering of the leaves of Beech or some other trees. It is a stately plant, and its immense leaves and curious spikes of rose-purple flowers are very attractive. It needs a light rich soil and ought not to be shaded in any way.

ALLIUM GIGANTEUM.—This plant, which came from central Asia, is a difficult subject, to say the least, in this climate, and in some gardens it invariably refuses to flower.

Mr. Endicott writes that it has bloomed with him the first time this year and proves to be exceedingly beautiful, carrying a spherical head of flowers on a stem a yard tall. More than a hundred florets unite to form a ball of a bright rosy color, which at first was some four inches across. As the early flowers faded, however, new buds pushed out beyond them and opened, making a still larger growth, and thus the fresh appearance of the whole was preserved at least twice as long as the existence of the individual blossoms. We should like to hear from other readers as to their success with this plant.

EICHORNEA AZUREA.—It is not often that we see this

the under side of the stems run deep into the water outside of the receptacle in which the plants are anchored. Mr. Oliver writes that at Gardiner Hubbard's place at Twin Oaks, near Washington, District of Columbia, a tub of this plant grown in this way had 180 spikes of flowers at one time, and was a most pleasing spectacle. In ponds with natural sides another good plan is to dig out some of the soil, replace it with rich material, and then insert the plants. The species is a native of tropical America, being found from Jamaica to south Brazil. The flowers are of no use for cutting, as they wilt in a very short time when taken from the plant.



Fig. 39.—*Deutzia Lemoinei*.—See page 284.

aquatic in perfect condition in Lily-ponds and fountain-basins, although its cultivation is of the easiest. The growths must, from their nature, float on the surface of the water, and the ideal home for them is a pond where the water is only about a foot deep, where the long roots can become fixed in the bottom. If it is desired to grow it in a fountain-basin, a box or tub should be sunk only a few inches below the surface of the water, the soil may be half loam and half manure, and pieces of the plant may be stuck in all about the margins; they make astonishing growth, and seem to derive nourishment from the rich compost all through the season, notwithstanding the long roots from

Cultural Department.

The Vegetable Garden.

PEAS.—The early and second early varieties of vegetables are now cleared away and the ground vacated by them has been prepared for our winter supply of Celery. Peas have done uncommonly well this year. The cool, moist weather during the first half of June and the absence of prolonged dry spells has caused them to make extra fine haulm, and the yield of pods is about double that of last year. There has been but little choice between the earliest varieties, First of All, Alaska, Lightning and Invicta all doing well. McLean's Advance still proves itself unexcelled as a second early variety. Among

the main crop varieties none surpass the old Champion of England; it gives double the yield of any other sort we grow. Evolution, Stratagem, Yorkshire Hero and Telephone, while superior to and more popular now than the older variety in Great Britain, do not approach it in all-round good qualities here. Our latest sowing is now well started. We use Advance and American Wonder for our last batch and sow them where a sprinkler can keep the ground moist. It is scarcely worth while to sow Peas as late as the first of July unless plenty of artificial moisture can be supplied.

CELERY.—The earliest planting of Celery is now growing nicely, and to continue it in good condition it is absolutely necessary to keep the plants well watered. If they once get a thorough drying up at the root they fall easy prey to rust and will not make good heads. Rust on the stems and foliage is the greatest fear of Celery growers. That excellent variety, Golden Self-blanching, is especially susceptible to its attacks if planted out very early. We have proved that if the trenches can be kept well soaked with water and the plants in a good growing state there is little trouble with this disease. Our winter crop of Celery has just been planted out on the ground previously occupied by early Peas. We plant in double rows in trenches twenty inches wide. Experience has taught us that it pays to grow this crop where the plants can be watered with the hose and our stock can all be readily watered by hand. To ward off the attacks of rust and leaf-blight we have had good results from spraying the plants with Bordeaux mixture. We give several applications during the season to all our stock, continuing until growth is almost completed. It does not take long to spray a few trenches, and three or four applications during the season will, in many cases, save the crop from ruin.

SWEET CORN.—Last year we made our latest sowing of Mammoth and Stowell's Evergreen on July 3d, and Crosby sown on July 15th gave us good ears until nearly the end of October. As a general rule, July 4th is as late as we can put in any variety with hopes of getting a picking, although in a favorable season we have had good returns from Crosby sown as late as July 20th. The cultivator must be freely used between the rows; the ground will bake more or less after every heavy shower, and to hold moisture in the ground and encourage growth it should be frequently stirred. From present appearance our earliest variety this season will be First Crop Sugar, Cory and Crosby being a few days behind.

TOMATOES.—Tomatoes are now ripening freely outdoors on such early sorts as Sutton's Earliest of All and Eclipse. Plants still fruiting indoors freely can be dispensed with by the middle of July. Many private growers now train their plants to trellises or tie them to stakes in preference to allowing them to ramble over the ground at will. An occasional tying and rubbing off of superfluous shoots and side laterals is all the labor required, and fifteen minutes each week will keep a hundred-foot trellis in excellent order. It is already necessary to think about next winter's crop, and a sowing of a good early variety like Nicholson's Early Chemin, or Eclipse, made by the middle of the month, will give ripe fruit when the outdoor supply is spent. The young seedlings should be pricked off and potted on to keep them growing nicely and of a stocky habit. They are best kept outdoors until the early part of September.

CUCUMBERS.—A sowing of White Spine Cucumbers in the open is still seasonable, while the English varieties for frame culture can be sown until the middle of the month and produce good crops without artificial heat. Two or three plants set out in a piece of bench in an ordinary greenhouse in rich compost and liberally treated, will yield an astonishing quantity of fruit. Plants in frames are benefited by having the glass whitewashed during the hot summer months, and plenty of water and liquid manure are essentials to a good crop. If black or green aphids appears, fumigation will be necessary, care being taken not to give it too strong and to thoroughly syringe the plants and to ventilate freely early the next morning.

MISCELLANEOUS.—Lettuces have done very well this season, and very few have run to seed. To keep up a regular supply we make fortnightly sowings. The following all prove themselves good summer varieties here: Salamander, Black-seeded Tennis-ball, Henderson's New York and Sutton's Cabbage, the last-named being the best. We sow String-beans until August 10th with good results. Mohawk and Valentine are good varieties. Brussels Sprouts, Savoy and others of the Brassica family should now be planted out and growing freely; any vacant ground cropped with Curled Borecole or Savoy will yield good returns. A little chemical fertilizer forked in the ground before the plants are set out will materially assist them. Asparagus beetles are apt to be troublesome in July and

August. A spraying with Paris green at the rate of one pound to one hundred gallons of water will clear them out. We sow Beet seeds early in August for a winter supply. This is a suitable time to sow Endive to give good heads for blanching in the fall. Onions are doing well now; a scattering of a special fertilizer fortnightly during the rest of the growing season will help to produce extra-fine bulbs, and careful hoeing is now necessary in order not to break the tops. Peppers and Egg-plants are liable to be broken later in the season by high winds, and we tie each of our plants to a stout stick. To secure fine fruit on Egg-plants plenty of liquid-manure should be applied once a week. If spent and decaying crops are cleared away, and all vacant ground filled with successional crops, the vegetable garden will continue attractive in appearance. Weeds now grow apace, and hoeing and cultivating will for some time be one of the principal operations.

Taunton, Mass.

W. N. Craig.

Greenhouse Plants Burned by the Sun.

THE burning of foliage by the sun's heat is a common occurrence in forcing-houses and conservatories, and is usually caused by irregularities in the glass, these often being thickened portions which serve the purpose of a lens and focus the sun's rays upon a point at a certain distance from the glass. It was formerly supposed that burning was caused entirely by air bubbles and sand spots in the glass, but some good authorities now claim that these do not cause burning.

During the latter part of last winter the leaves of Lettuce-plants growing on the centre bench of one of our forcing-houses were burned slightly. The house extends north and south, and second-quality, double-thick glass was used in its construction. In certain places a band of strong light was thrown across some of the plants, and close below it a shadow corresponding in width to the bright band. These two bands were found where the glass was lapped, and extended the entire width of the pane, which is fourteen inches. There are several laps in the roof of the house where this occurs and bands of varying degrees of intensity are formed on sunny days. A thermometer placed in one of the brightest bands registered twelve degrees higher than when held just outside the band. If the house temperature reached a high point at a time when there was little moisture in the atmosphere the additional increase of twelve degrees in temperature would doubtless be sufficient to burn the plants.

The presence of the dark band, with the light band directly above it, shows that the amount of light which should fall upon a space, say, three inches wide, was made to fall upon a space of about half that breadth, leaving the other half a dark shadow. At first I was inclined to suppose it was caused entirely by the lap of the glass, the light being either reflected from, or refracted through, the edges of the panes; yet other laps close by cast scarcely a shadow, and there was no bright band. Examination of these panes of glass exposed the real trouble, an irregularity reaching across the lower end of the upper pane in each case. This was evidently the "block-end" of the glass, and a curvature was quite noticeable, the convex surface being above. The panes producing the most intense bands were the most curved. This curvature would tend to converge the rays toward some point, or, rather, line, beyond the plants, acting much like a lens. There may be a difference in thickness, too, but both surfaces are curved, the upper convex, the lower concave; thus it seems probable that the trouble was caused entirely, or almost entirely, by the sun's rays being refracted while passing through the curved glass.

Agric'l Experiment Station, New Haven, Conn.

W. E. Britton.

Carnation Notes.

THE outdoor stock is looking extremely well with us this season. The plants are benefited by the copious rains of the first half of June and are twice as large as the plants of a year ago. The plants for winter flowering are looked over once a week and tipped. If left longer than a week and allowed to run up almost to flower the plant is exhausted when the pinching back is done, and fails to develop as shapely a specimen later on. Among the newer introductions Della Fox, Armazindy, Triumph and Abundance are all making good growth. Jubilee is at present rather small, but appears to be of a naturally robust habit, and may make good plants before lifting-time. Jubilee is the only variety we have which has unmistakable signs of rust. We spray these plants with Fowler's Arsenical Solution once in ten days, and this kills the spores as they appear. Summer varieties growing out-of-doors are now flowering freely; the earliest and most florifer-

ous of these are Daybreak, Mrs. Fisher and a scarlet and crimson seedling which we only have under number. None of the introductions of 1895, such as Meteor, Bridesmaid, Alaska and Rose Queen, appear to be of any value as summer bloomers. The hand cultivator and hoe are used after every rainfall to stir up the soil among the plants; they will not thrive if it is allowed to become baked and slimy on the surface. A few minutes suffice to stir up a good-sized bed with a hand cultivator, and if an iron rake is drawn between the rows to remove foot-marks the beds will have a neat appearance. When to discontinue the tipping of winter-flowering plants depends on the time the plants are required to be in bloom and the date at which they are to be housed. We generally stop topping about August 10th; naturally, late-blooming kinds are best untouched after August 1st, while some vigorous-growing and earlier sorts may be pinched until August 20th.

Plants under glass are still yielding us a large crop of extra-fine bloom. The most satisfactory bloomers during the present hot weather are Lizzie McGowan, Hector, William Scott and Madame Diaz Albertini; the poorest bloomers are Bridesmaid, Rose Queen, Meteor, Thomas Cartledge and Bouton d'Or. Alaska is the only one of last year's novelties which is proving itself an acquisition; it has not flowered so freely as Lizzie McGowan, however, taking the whole season through, and we do not think it will supersede the last-named popular variety. Daybreak during hot weather does only moderately well, and the flowers quickly fade in color when expanded. The same is true, to some extent, of William Scott, which requires picking before being fully expanded to hold its color. Nicholson is blooming rather sparingly, but Tidal Wave continues to flower quite freely. Helen Keller yields us some nice blooms, which are, however, smaller than those produced during the spring months.

It is well at this time to pay some attention to the compost-heap. The soil for our benches was mixed up early last spring, and was turned over a few weeks ago. Early in August we turn it over again and mix some bone-dust through it. It is a common thing to see compost-heaps grown over with rank weeds all through the summer months. After carefully preparing and mixing such heaps it is surely careless to allow weeds to extract a large part of the nourishment from them. A few minutes' labor once in two or three weeks will suffice to remove all weeds, thus making the compost-heap more pleasing to the eye as well as assuring better growth and bloom for the Carnations to be grown in the soil during the coming winter. These items may appear small to many, but it is only by attention to such details that success is attained.

Taunton, Mass.

W. N. Craig.

The Hardy Plant Border.

ENOOTHERAS are beautiful and attractive hardy plants, most suitable for the front of the herbaceous or shrubby border, and they are not fastidious as to soil, provided they have a sunny position. The perennial kinds are easily propagated by division, seed or cuttings. *E. rosea*, a Mexican species, is one of the best of the half-hardy kinds. It grows to a height of one foot. The toothed leaves are small, and the flowers are about four inches in diameter, of a delicate rosy pink color. This species is also useful grown as a pot plant. *O. taraxacifolia* is also very useful. The stems are prostrate and the leaves resemble those of the common Dandelion. The flowers are borne singly on stalks six inches long; they are four inches in diameter and of a pale pink. *O. Fraseri*, a native of the central and southern states, grows to a height of eighteen inches. The leaves are sessile, lanceolate, from three to nine inches long by one inch wide, and the flowers are about two inches in diameter, orange color, and borne on short stalks in the axils of the leaves. *O. fruticosa*, var. *linearis*, is a low-growing, somewhat shrubby species, with small linear leaves and yellow flowers an inch and a half in diameter. This species is, perhaps, the most floriferous of them all, not only in number of flowers, but in the length of time it is in bloom. *O. fruticosa*, var. *Youngi*, has larger leaves and flowers of a deeper yellow, and grows somewhat taller. *O. tenella*, an annual from Chili, grows about one foot in height. The leaves are small and lanceolate in outline. The flowers are about one inch in diameter, of a purplish color, and borne on short stalks singly in the axils of the leaves.

Lopezia minima is a neat little annual belonging to the same family as *E. rosea*. It grows to a height of one foot. The leaves are ovate-lanceolate, from one to three inches long by three-quarters wide. The flowers, which are small and pink, are borne on short stalks singly in the axils of the leaves below, but become crowded at the summit. It is a native of Mexico.

Cuphea Zimapani is now flowering in the borders here. It is a native of Mexico and grows about two feet in height. The stem is much branched and covered with viscid hairs. The leaves are opposite, obovate in outline, an inch and a half long by three-quarters wide, on short petioles. The flowers are much larger than those of most *Cupheas*, and are of a deep purple color. It is a very interesting plant, though not particularly showy, and is well worthy of a place in the hardy plant border. It is easily propagated either by seeds or cuttings.

We have seventeen species and varieties of *Veronica* in the collection here. Of the spicate flowering kinds we have one in flower now under the name of *V. rosea*, a pink-flowered kind, and an exceptionally good one. It grows about two feet high and the stems are much branched. The leaves are borne on short petioles, lanceolate, two inches long by three-quarters wide and serrate edges. The flower-spikes are two to six inches long. Though it came to us under the name of *V. rosea*, I suspect that it is a variety of the well-known *V. longifolia*. Pink-flowered *Veronicas* are not common, but this kind ought to become very popular. I have not yet tried if it reproduces itself from seed, but it is easily propagated either by division or cuttings. It has proved itself perfectly hardy here without protection. *V. longifolia*, var. *subsessilis*, a Japanese variety, is the best of blue-flowered spicate varieties with which I am acquainted. It grows from two to three feet in height. The leaves are six inches long by two wide, ovate-lanceolate in outline and with serrate edges. The flowers are carried on large terminal spikes and are of an intense blue. It is perfectly hardy here without protection. *V. incana* has been in flower here for the past three weeks. I consider this species next in value to the one just described. The bright blue spikes of flowers are in striking contrast with the hoary leaves. It is a native of north-western Europe, and is readily propagated either by seed or division. Among the prostrate species I consider *V. rupestris* the best. It is a native of southern Russia, and is useful both in the rock garden or the front of the herbaceous border. It is spreading, without becoming "weedy," and forms a perfect carpet of bright blue flowers toward the end of May.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

The Flower Garden.

THE spotted *Calla*, *Richardia albo-maculata*, is very pretty and satisfactory if properly grown. I remember two beds of these plants on a lawn, each containing about one hundred and fifty plants. They were planted in rich soil and had been well-watered and cared for from the beginning, and formed masses of broad foliage much finer and larger than that of the species commonly seen. The flowers of this *Calla* are, I think, much finer than they used to be. Ten years ago they seldom opened very wide; they were always half-closed and appeared unpromising, but cultivation seems to have changed all that. When the flower is past its best it closes up and the spathe turns green, but when in its prime it is as open and as perfect in color and shape as the *Calla* of older days. I spoke a year ago of some curious formations among these flowers. This year I find several of a new type in which the outer half of the spathe is green, with white spots, exactly like the leaves, except that the texture is like that of the spathes. A handful of the flowers with a number of the leaves makes a handsome ornament in any room. The blossoms last a long time and give a feeling of coolness on a hot day.

I like to grow a few plants of *Hyacinthus candicans* in pots every year. They will grow five feet high in a six-inch pot, and yield as good flowers as they would in the open ground, though the foliage is less massive. Potted in January they will bloom in May. It is singular that bulbs thus forced and dried off in June are no better for the next year's forcing than those grown in the open ground and dried off in October.

Lilium Lowi has just passed out of flower. It is a beautiful kind with drooping white flowers thickly spotted inside with rose. These blooms are about three inches long, the segments not at all reflexed nor even turned outward; indeed, the shape reminds me of *Fritillaria pallidiflora*. *L. Japonicum* Colchesteri, so-called, is now in full beauty; it is one of the most beautiful of Lilies, much superior to *L. Browni*, which is flowering near by, and its fragrance, though strong, is not in the least heavy or disagreeable. *L. Nepalense* is coming on rapidly, a species of singular coloring, very striking rather than very pretty.

I was surprised to see in one of your recent issues that *Camassia esculenta* needs covering in winter; with me it is

perfectly hardy, flowering every year, though I give it no protection at all. Perhaps it is worth while to say that the Persimmon, said in *The Gardeners' Chronicle* to need the shelter of a wall in England, is perfectly hardy here. I have three trees, ten feet high, raised from seeds sent from North Carolina, which at this moment are in full leaf, though they were twice exposed last winter to a temperature of seventeen degrees below zero.

Canton, Mass.

W. E. Endicott.

Notes from the Botanic Garden, Washington.

EARLY in the season I planted out some seedlings of *Lobelia tenuior* (*L. heterophylla*). Although an old plant, having been introduced over fifty years ago, I saw it for the first time at Kew Gardens last year in the lobeliaceous bed. It has flowers surpassing in brilliancy any other blue *Lobelia* with which I am acquainted. The flowers are large, many borne on small plants. At the time I saw it in flower it occurred to me that it would stand our hot summers better than the varieties of *L. erinus*. This has proved to be a fact, and plants of the latter which were put out in the grounds here have succumbed to the heat several weeks ago. *L. tenuior* is, however, still growing and flowering in a most gorgeous manner, and even if it should not last much longer it is well worth cultivating for the display it makes in the early months. There are white and also red flowered forms. The white form has flowers fully as large as those of the blue form, but the red one is small-flowered and not very attractive. The species is figured in Curtis's *Botanical Magazine* (3784), but the flowers there given are smaller than those on the plants here and also on those seen at Kew last year. There are dwarf forms of it growing to a height of about eight inches, while the type reaches a height of two feet. It is a native of west Australia.

In one of the greenhouses of the Washington Botanic Garden a large plant of *Pavetta indica* has been in fine flower for a month or longer. The genus is a near ally of *Ixora*, and the general appearance of *P. indica* suggests species of that popular stove-plant. In this species the flowers are pure white in large terminal panicles. It is seemingly a difficult subject to manage successfully in a pot. The plant in the greenhouse has been planted out for at least twelve years. Until this season it has flowered sparingly, but during the last month there have been upward of fifty panicles of bloom fully expanded at one time.

At the time of the introduction of *Platycodon grandiflorum Mariesii*, by Mr. Maries a few years ago, it was said to be dwarfer than the type, with larger flowers. Some six or eight years ago I raised a number of plants from seed. They all flowered the first season, the plants at the time of flowering being only about three inches high; the flowers, even then, were larger than those of *Platycodon grandiflorum*. Since that time the growth has each year been larger, until now the plants are taller by several inches than any plant of the typical *P. grandiflorum* I have ever seen. Some of the flowers measure three inches in diameter. This genus does not seem to suffer much from protracted dry spells, as the thick fleshy roots go deep down into the soil in search of moisture. The hot sun wilts the flowers in the middle of the day, but they freshen up again when it becomes cooler.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Calamus ciliaris.—The genus *Calamus* contains some remarkable species of climbing Palms, natives of India, Java and other extra-tropical countries. Aside from their economic importance, a few species are valuable plants for the conservatory, with graceful habits and exquisitely beautiful leaves. They often flower under cultivation, especially *C. viminalis*, which is a rather common species of interest as furnishing the cane used for seats, chairs, screens and other work. *C. ciliaris* is, however, the most ornamental of all, and is frequently seen in well-equipped establishments. It is used for decorative purposes in the same manner as *Cocos Weddelliana*, to which species it is superior from an ornamental point of view. The leaves are from six inches to a foot long, closely pinnate, with from thirty to forty pairs of linear-lanceolate pinnæ. The petiole is comparatively short, clothed with rough, reddish hairs and a few coarse hooked spines; it forms an almost globular sheathing base considerably thicker than the slender, spiny stem. The upper surface of the leaves is covered with fine white bristles and the edges are finely fringed, the almost invisible hairs being a quarter of an inch long on specimens of robust growth. Opposite each leaf peculiar hooked and jointed tendrils are formed, which eventually become very

long and thread-like in appearance. These tendrils are very effective supports when the species grows among other plants, as the hooks, which are disposed in numerous pairs on the inside, are exceedingly strong and sharp. The flowers are generally borne in summer on long whip-like shoots from the axils of the upper leaves. The inflorescence is a remarkable transformed branch, supplied with tendrils and forming several clusters of flowers, having the proper position of leaves with the peduncle sheathed at the base. The flowers are placed on small spikelets in groups of three—one larger female flower in the centre and two male flowers, all inconspicuous and of a greenish yellow color. All species of *Calamus* require great heat and moisture, a close atmosphere and considerable shade. They thrive in a compost of equal parts rich fibrous loam, leaf-mold, sand and cow-manure. Strong plants form numerous suckers at the base, which are used for propagation.

New York.

N. J. R.

Correspondence.

Jackson Park in June.

To the Editor of GARDEN AND FOREST:

Sir,—Those who came to the Columbian Exposition in 1893 are likely to retain an interest in Jackson Park for a long time. Its dilapidated condition since the closing of the Exposition, through the destruction of the buildings by fire and by their dismantling and the removal of the debris, together with the work of restoration, can be fully realized only by those who visit the park frequently and watch the changes. In a sense they are to be congratulated. Those who can pass over the interval of dilapidation and restoration, and remembering the park of the Exposition, may yet be permitted to see the perfected Jackson Park of the future. And yet I confess to a degree of fascination in watching the transformation of so unsightly a piece of ground into the well-ordered and beautiful place it has partly become already.

Aside from the Fine Arts building, now the Field Columbian Museum, the lagoon immediately south of it and a few other minor features, the portion that has been least changed or interfered with is the Wooded Island. The changes which have occurred are such as are mainly due to time, making it more mature in appearance and increasing its attractiveness. At the time of the Exposition all wore the marks of newness, of planting to meet an emergency, however well it was done. The use for advertising and commercial purposes was everywhere apparent. Now such uses do not obtrude, the pleasure is unalloyed, and the visitor sits in the shade of the trees or traverses the paths with a feeling that all is designed for enjoyment. As a place of quiet seclusion, of complete change from the noise and turmoil of a busy city, a relief to the eye that has tired of rows of buildings and paved streets, it approves itself at once, and shows the wisdom as well as the need of setting apart such spots for rest and recreation. The teeming thoroughfares of the city just by are as effectually closed to sight and hearing as if they were miles away. Even the waters of the great lake are mostly hidden, and passing vessels do not interpose and suggest the world of commerce.

This state of seclusion, so welcome to the tired denizen of the city, has been produced by the growth of the trees and shrubs which border the enclosing lagoons. Three years have made such changes as to add much to the beauty and effectiveness of this border. It now serves a purpose in shutting off from sight the rest of the park with its driveways and carriages. At the time of the Exposition this would have been a defect, for had the border reached its present stage much of the beautiful architecture which it was a delight to look at from the island would have been hidden. The Willows have attained such a size that their limbs stretch out over the water or droop gracefully toward its surface. When viewed from the opposite shore the quiet lake or sluggish stream of the country-side is suggested, and the plantings are asserting themselves so well and gaining so natural a look as to leave the impression that they might have stood there for an indefinite time. Seen from within the Willows, with their lighter foliage, make an effective foil for the mass of shrubbery and scattered trees which stand between them and the lawns. There are many shades of green in this mass of foliage and many forms of leaves. Flowering shrubs in their season add to the variety, but such kinds have, in the main, been selected as are not obtrusive in color. In June the Mock Orange admirably diversified the picture with the quiet beauty of its white or creamy flowers set in the surrounding green, and many of the plants

were so laden that the branches drooped from the weight of bloom.

The principal floral attraction of the island in June has been the Rose garden. This comprises an acre of ground in the form of a quadrangle, which was laid out in beds and winding paths and planted with hardy and half-hardy Roses at the time of the Exposition. These have been maintained, and draw thousands of visitors during the flowering season, while the later and monthly-blooming Roses keep up a succession of flowers and are attractive throughout the summer. A low trellis, now well covered with rambling Roses, encloses the garden, and from the surrounding path it is easy to look over the hedge and survey the garden and its varied colors as a whole.

The work on the revised plan of Jackson Park has progressed far enough to show how the northern end and the portion between the West Lagoon and Stoney Island Avenue, which forms the western boundary, will look when completed. All this section is now open to the public, the drives, walks and principal parts of the lawns being done, and the plantings largely made. A low ridge has also been raised throughout its length and parallel with the avenue. This has been planted with trees and shrubs, and in time the city will be screened from sight. There is now a completed driveway beginning at the south-west corner and running parallel with the ridge, and the lawns between the trees are substantially done. These portions of the park have been the first to receive attention, being the most accessible, and in part necessary to shut out the view of the city. The work of the present season is made plain by reference to the map of Jackson Park published in GARDEN AND FOREST, May 20th, 1896, page 205. This comprises the carriage-way and walks beginning with the entrances at Sixty-third and Sixty-fourth Streets, which pass south of the Wooded Island and East and West Lagoons to the shore of Lake Michigan, where they turn northward along the paved beach till they intersect those already finished in the neighborhood of the Restaurant or German building of the Exposition. This carriage-way will soon be completed, and the work will go on with the part lying between it and the lagoons. At the present rate of work throughout the season this part, taking in the sites of the Transportation, Mining, Electricity, Liberal Arts and Government buildings, and some outlying portions, will be mainly finished and open for public use before winter. Altogether a little more than half the area of the park will then be improved.

Chicago, Ill.

E. J. Hill.

Some American Fruit Associations.

To the Editor of GARDEN AND FOREST:

Sir,—In some ways California and Oregon fruit-growers will always feel the need of better organization than do those growers who are able to visit their commission men every day or every week in the year. Local causes long ago led to the formation of local and district unions in California. Some consist of all the fruit-growers in a given valley or township or county; generally, however, those who are engaged in one line of fruit-growing unite. Thus we have the Saratoga Prune-raisers' Association, the Santa Paula Lemon-growers' Exchange, etc. Some associations are formed exclusively for drying fruit, but most of them handle the product in whatever way seems at the time best. These smaller associations have now trained many efficient business men fit to handle large enterprises upon profit to themselves and others. Hence, we are entering upon an era of very active organizations of much broader scope. Mr. T. H. B. Chamblin, for instance, was trained at Riverside in the difficult task of uniting the orange-growers there. He has organized dozens of similar bodies throughout the southern counties, and these are bound together by the great Southern California Fruit Exchange. At this time four-fifths of the orange-growers of southern California, embracing nearly all the growers of real standing, are connected with the unions, which have proved themselves of great value.

The raisin-growers of central California, particularly of the Fresno district, are now being organized on much the same lines. The prune-growers of Santa Clara valley are already working together. Many other classes of California fruit-producers have formed associations, and in a few years more there will be a State Union of much importance. The process has gone further in Oregon, where problems were less complex, and their Oregon Fruit Union is already coöperating with Washington unions as the North-west Fruit-growers' Association. All attempts to establish associations in communities that are not sufficiently educated and are not ready to take up the work have been entire failures. Strong and active unions

are in existence elsewhere, notably in New York, as the Chautauqua Grape-growers' and Shipping Association; also in Georgia, in Missouri and in Illinois, in Michigan, and, in fact, in nearly all the great fruit-producing districts of the United States and Canada.

Last month, in response to a call, delegates from nearly all the fruit unions in America met in Chicago, May 20th, 1896, and organized the American Fruit-growers' Union, adopted laws, elected an Executive Board and other officers and opened general offices. The delegates present reported that they controlled more than 50,000 car-loads of fruit.

There are, of course, several ways to handle fruit. It may be sold by the grower for spot cash, or on time to some local agent or commission house; it may be consigned for sale to some dealer or association; it may reach the consumer through the open auction-houses or through closed auctions—that is, at auctions where only dealers can offer bids. I am not advocating, in these brief historical notes, any one way as always best for the grower, but I am certainly bound to record my own impressions, which are that the more intelligent and enterprising fruit-growing communities are becoming coöperative and aim to control their crops until those crops are sold.

Leading men of the unions tell me that it is not the intention to revolutionize present methods of fruit shipment, nor is it their object to work in any other way than in complete harmony with reputable commission and fruit-jobbing houses. They endeavor to adopt, modify and improve the present systems, to protect the markets, to ascertain which are reliable houses, to act as general receivers of fruit and distribute it wherever it is needed, and, in brief, to simplify the whole system, reducing expenses all along the line. It seems certain that organization of this kind, if honest and intelligent, must benefit both producer and consumer, must prevent waste and loss, must enable small growers, by combination, to deal on better terms with transportation companies, auction-houses and large buying firms. Commission-houses who buy f. o. b., and then refuse to accept the car-load, under false pretenses, because the market has meanwhile dropped, are not able to do this with a strong state or national union employing an able lawyer and ready to protect every one of their shippers. On the other hand, the shippers themselves, if in fault, will be taught better methods of grading and packing, and brought up to the standards of the various associations and to the changing requirements of the markets.

The management of successful local unions is extremely business-like and economical. Salaries are not large, expenses are kept down, the tax of a cent or less a box which is levied upon fruit passing through their hands is all accounted for, and any surplus credited back; the members get all the dividends. This American Fruit-growers' Union proposes to take, as a maximum, one dollar a ton for its services and expenses, and it expects to save members a good deal more than this amount by contracts which reduce commissions of middlemen and by systematizing distribution.

One of the most suggestive features of all coöperation is its promise of closer human alliances. The fruit-growers become business men and women, which is excellent; they learn how to help each other, which is even better. In one place I know of there are only three fruit-growers out of, perhaps, two hundred who have not learned this lesson of coöperation. These three claim that they make as much, or even more, by staying out; they also receive a benefit from the unions, which have increased the profits of all growers.

Niles, Calif.

Charles H. Shinn.

Recent Publications.

No. 8 of the third volume of the *Contributions of the United States National Herbarium* is devoted to the Flora of the Black Hills of Southern Dakota by P. A. Rydberg. The region is one of special interest geographically as the meeting place of several different floras, those from the east, from the Saskatchewan, from the prairies and table-lands west of the Missouri River, and from the Rocky Mountains, mingling here. "In the foothills and the lower parts of the hills proper the flora," Mr. Rydberg tells us, "is essentially the same as that of the surrounding plains, with an addition of eastern plants which have ascended the streams. In the higher parts the flora is of more northern origin. Most of the plants composing it are of a more or less transcontinental distribution, but often characteristic of a higher latitude. Some can be said to belong to the Rocky Mountain

region. The only trees of western origin are *Pinus ponderosa scopulorum* and *Betula occidentalis*; the others are eastern or transcontinental. The flora resembles, therefore, more the region around the Great Lakes than that of the Rockies." Mr. Rydberg's report is based on his own botanical exploration made in 1892 as a field agent of the Department of Agriculture, and covering three months from about June 1st. His collection contained a little over seven hundred Phanerogams and vascular Cryptogams.

Notes.

Yucca angustifolia is not as robust nor stately a plant as *Y. filamentosa*, which is more generally known in cultivation. It has the advantage of flowering two weeks earlier, however, than the other species, and for this reason alone it is desirable in a collection of hardy perennial plants.

The health officer of San Francisco recently examined eight samples of fruit jellies bought in the open market, and not one of them proved to be made of sound ripe fruit. Several apple jellies were colored, while one in tin contained turnip pulp, colored with aniline dye to represent strawberry jelly.

Eggplants from New Jersey are among the later offerings in vegetables, and cucumbers from the same state and from Maryland. Tomatoes from New Jersey are plentiful and of good quality and are crowding southern-grown stock out of market. Peas, beans, sugar corn, peppers, cabbage and squashes are all coming from near-by points. Asparagus is still in fair supply and of good quality, and costs twenty-five cents a bunch.

Professor Halsted writes that complaints have come to him from several directions of the blight which attacks the leaves of *Nasturtiums* before they are fully grown, showing colored spots which are watery at first, but soon become blotched with brown. The disease seems similar to the bacterial blight of the Bean, and a microscopic examination of the germs suggests that the organisms may be the same. This theory is still further corroborated by the fact that one of the worst cases of this blight which has been brought to Professor Halsted's attention was on plants growing within a few feet of a field of Beans badly affected with the bacterial disease.

There are few trees in flower during the first weeks of July, and for this reason the large branching panicles of small but bright yellow flowers on the ends of the branches of the *Koeleruteria* always make this tree a conspicuous object at this season. Owing to abundant rains for a month past its foliage is thick and abundant, and it always is of the deepest and darkest green, which strongly brings out the pure color of the flowers. The *Koeleruteria* is a comparatively small round-headed tree, useful not only as a single specimen on the lawn, but interesting also when planted on a wood border, which the flowers light up at this season in an attractive way.

A writer in *The Garden* speaks in praise of the annual species of *Gypsophila*, like *G. elegans*, a plant which grows to a height of one or two feet, with a loosely spreading panicle of small white or rosy flowers. *G. muralis*, a lower plant, with pink or purple flowers on very slender pedicels and with very narrow linear leaves, is also an admirable plant for cutting, and can be used like the well-known perennial *G. paniculata* to give a misty surrounding for brighter flowers. Both of these annuals will come up from the seed every year, and, although they start rather late, they mature rapidly and will flower in early July. Seed started in a cold frame will produce flowers much earlier, of course. *G. muralis* has already become naturalized in a few places in this country.

Mr. Elijah A. Wood, writing to the *American Florist*, says that when *Chrysanthemums* have been overfed, as they sometimes are at this season, the trouble can be detected by the light and sickly color of the foliage. Of course, the liquid-manure must be stopped at once, a little charcoal and lime should be sprinkled on the soil, and until the plants have regained their color they should have no liquid fertilizer, when a very weak solution can be used to begin with. Soot from soft coal is very useful for *Chrysanthemums* which are sick from overfeeding. It can be sifted upon the soil and washed down gradually to the roots of the plants, or a bag of it can be hung in a barrel of the water which is used for watering the plants. Of course, it should be used in a very diluted state.

Frequent rains during the past month have made small fruits unusually plentiful, and prices of blackberries, raspber-

ries, huckleberries and gooseberries have been lower than for some years. Beach plums, from Delaware and Maryland, have found but few buyers, Wild-goose plums, from the same state, selling for nearly twice as much. The best grapes now in market in this city are Niagaras from Florida, and Moore's Early from South Carolina. Muskmelons are coming in considerable quantity from North and South Carolina, the best Jenny Linds and Christinas being from the neighborhood of Norfolk, Virginia. The supply of watermelons is not so great as during the past month, and prices are higher than they have been, the best realizing \$25.00 in lots of 100. Sweet Bough, Astrachan and Harvest apples, from Delaware, Maryland and near-by points, bring fair prices for good fruit, hand-picked and well packed. All the standard varieties of peaches are now arriving from South Carolina and Georgia, but most of the fruit is lacking in color or size or soundness, and this is true also of the moderate shipments from Delaware and Maryland. The thirty-four car-loads of California fruit sold here during last week included one car of cherries, probably the last for this year, of the large showy Royal Ann variety. Plums, peaches, apricots and Bartlett pears made up the principal offerings from the western coast.

Eighteen insects are known to infest the seed of Indian Corn, twenty-seven attack the roots and the subterranean part of the stock, seventy-six feed upon the stalk above the ground, a hundred and eighteen upon the leaves, nineteen upon the tassel and silk, forty-two upon the ear in the field, two on the stack fodder and twenty-four on the corn when stored, either whole or ground. No doubt there are many other insects than these which injure the corn to a limited extent, but that is no assurance that they will not prove formidable in the future, since the two insects most destructive at the present time, namely, the corn-root worm and the corn-root aphid, were almost unknown a few years ago, even to entomologists. A rather complete treatise on the insects which injure the seed and root of Indian Corn has just been issued by Dr. S. A. Forbes as a bulletin of the Illinois Agricultural Experiment Station, although it is, with some alterations, an abstract from the author's report as State Entomologist of Illinois, first published rather more than a year ago. Before a detailed discussion of the injuries to seed and root which covers rather more than eighty pages, there is a valuable collection of practical hints which aid the cultivator to determine where and what kind of insects are at work upon the crop, and how they are to be routed. Altogether, it is a most instructive and useful little monograph for popular use, and it is to be commended for the perfect system with which the subject is treated, since the orderly mode of discussion and procedure enables any layman immediately to get at what he wants.

In a late issue of *The Florida Agriculturist* the Messrs. Neylans, of Tampa, Florida, give an interesting account of their experience in cultivating Celery in that state. Seed-sowing is begun in August and continued until November, the later sowings insuring the largest number of plants. When the plants are about six inches high they are transplanted on ridges four feet wide, two rows on each ridge, the plants being set from five to six inches apart in the rows. The celery is blanched when it is mature, which is told by the color of the tops. Boards one by twelve, sixteen feet long, are used, stood up on each side of the rows. The blanching is said to be the most important cultural detail, and must be learned by experience; if continued too long the celery will not keep, and if not long enough it will not be in good marketable condition. The time required for blanching is influenced by the weather. It takes about six months to raise and blanch a crop from the sowing of the seed. There is a thorough system of irrigation from artesian wells, and the water is run between the rows in dry weather. Irrigation is considered a necessity for this crop in Florida. Commercial fertilizers have been used exclusively for the past eight years, about three tons to the acre, at a cost of \$75.00 an acre each year, and the ground is very fertile. The sales on the farm for the last five years have averaged \$1,000 to the acre, the crops, besides Celery, being Potatoes, Cabbage, Lettuce, Spinach, Beets, Carrots, Radishes, and some Squashes, Cucumbers and Tomatoes, but the soil is too rich for the latter crop. On eight acres of Celery, comprising last year's sowing, \$1,500 was netted; the expenses were about \$500 an acre. This success has only been achieved after experiments and losses, and six acres of the variety Giant Pascal planted three years ago proved an entire failure. The Golden Self-Blanching variety is the only kind now grown. It is intended, however, to try several other varieties this year, as it is difficult to grow plants of Golden Self-Blanching in the hot weather of summer and autumn.

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The Lesson of the Daisies.

NO one who has chanced to make a somewhat extended tour through the farm-lands of any part of the middle states during the last of June or the first of July can have failed to notice how large a fraction of the area was white for the harvest—a harvest not of grain, but of Ox-eye Daisies. Fields of Buckwheat at the height of their bloom were never whiter than many lowlands which once were rich meadows, and many hillsides which once were rich pastures. The daisies are so prevalent and luxurious this year that a stranger might suspect that all the farmers had gone into the business of floriculture, but a few questions will soon dispel this illusion, for the growers of the Daisies very rarely appreciate their beauty. It is a genuine and destructive invasion, and yet the Daisies have not conquered the meadows; they have merely stepped in to occupy and possess the soil which the grass had abandoned. The worst of it is that the great majority of the tillers of the soil do not apprehend the true condition of things, and while they bewail the fate which forces them to harvest daisies instead of grain or hay, they do not realize the fact that they have invited the attack and encouraged the invaders.

Occasionally a farmer is heard to ask how these weeds can be killed, but he does not realize that if by some rapid process they could all be dispatched new legions would fill their places at once if the conditions which they enjoy remain. What farmers need to comprehend is that without some radical mistake in the management of their land the Daisies never would have gained such a foothold. All plants, including weeds, settle and thrive where the competition for life is such that they can enter into it and prosper. A good stand of Grass leaves no room nor any hope for weeds. It is not in well-tilled fields that Canada Thistles flourish, but in neglected pastures and by the roadsides. In the contest with the best agricultural practice they cannot prevail. It is in the untilled plains of the west or in the tilled regions where there is mile after mile of plowed land producing only eight or nine bushels of wheat to the acre year after year, without any rotation,

where the Russian Thistle is a natural and inevitable intruder.

The remedy for weeds is to keep the land busy with a good crop on it, and this means that the farmer must give persistent and connected thought to his business. If the Daisies crowd out the Grass, it is because the meadow has been neglected and the grass has begun to fail, and wherever there is a vacancy by the failure of the grass every enterprising weed finds a rightful opportunity to establish itself. If the farmer asks, therefore, what will kill the Daisies, there is one answer: better farming. Weeds find nourishment and a home wherever there is waste ground, which means ground not profitably occupied. Widespread areas of Daisies, Buttercups, Wild Carrots, Mustards and the like are, therefore, the types and measures of the prevailing ignorance of farmers respecting the very fundamental principles of their calling. The one good thing that weeds can accomplish is to prove by their presence that there is a weak point in the established system of agriculture; the only way to turn their visits to advantage is to heed this instruction by revolutionizing farm practice and organizing some profitable rotation which will exclude them.

If farmers cannot interpret the teachings of the weeds it certainly would be advisable for the agricultural experiment stations to help them in this particular. The existence of these invaders means that what the farmers of these states primarily need is more instruction in fundamental matters concerning the handling of their land. We are glad, therefore, to see that many of the stations are turning to this subject, and that they are doing more than merely furnishing botanical descriptions of the various noxious plants. The Cornell Station, for example, in a bulletin entitled *Reflections Upon Weeds*, gives some sound primary instruction in agricultural science. It is to be hoped that both this station and others will continue work of this sort even if they forego to some extent experimentation in higher fields. So long as the farmer needs elementary teaching it ought to be furnished to him, even if it takes the time of officials who ought to be searching for scientific truth. A late bulletin of the Geneva Experiment Station upon the principles which underlie the application of commercial fertilizers deals with the simplest matters, matters with which every intelligent farmer ought to be familiar, and yet there is no doubt that every word of it is needed. The time may come in America, as it has come in some older countries, when the common schools instruct children in the principles of agriculture—so that in fundamental points of practice the ordinary farmer will know what to do, and will be able to tell why he does it. Until that day arrives every effort to increase his knowledge of principles deserves encouragement.

AN interesting correspondence has been forwarded to us by Volney Rogers, Esq., one of the Park Commissioners of Youngstown, Ohio. An observing citizen who, Mr. Rogers says, is usually correct in his judgment on such matters, wrote him to call attention to the destruction of several large Hemlocks in the beautiful park of that city, adding that the injury was caused by the work of the yellow-bellied sapsucker. He therefore suggested the employment by the Park Board of an active young man with a small-bore shot-gun to thin them out. Mr. Rogers replied that, in his opinion, the Hemlocks have been dying partly because of two dry seasons, and partly because they have been thinned out for driveways, so that their trunks and roots have been exposed to the sun. He added that sometimes roots of considerable size have been cut along the paths and drives, and this mutilation may have weakened the trees. Fires have also swept through the timber in certain places.

Of course, it is not safe to pronounce an opinion on a question like this without closer investigation, but we should advise Mr. Rogers to keep the "active young man with the small-bore shot-gun" out of his Hemlock groves

and encourage the birds to come there and stay. The sapsucker, *Sphyrapicus varius*, does drill holes in trees for the purpose of getting the elaborated sap and parts of the cambium layer, and in very exceptional cases quite young trees have been injured by them. The damage, however, is too insignificant to justify the persecution of these birds in view of the immense benefit they do in other ways. In Ohio the bird is only a migrant, at all events. Mr. Frank Bolles (see *The Auk*, vol. viii., July, 1891) concludes that while in their breeding-grounds these birds may sometimes destroy forest-trees, the damage is insignificant in a well-wooded region. Moreover, it is certain that the sapsucker, or yellow-bellied woodpecker, is the only species at all guilty. Now, the active young man with a shot-gun would undoubtedly kill every kind of woodpecker he saw; indeed, many other species are called sapsucker; for instance, the downy woodpecker and the hairy woodpecker, and both of them are very beneficial to trees. The public need instruction as to the value and preservation of these birds much more than they need encouragement to destroy them. When we think how much the entire agricultural interest of the country, and all that this implies, depends on the activity of birds, it is enough to lead one to take their side in every case where their habits are called in question.

On the other hand, the Hemlock is one of the trees which are particularly sensitive to any change of their surroundings like the cutting away of trees, so as to let in the wind and sun. Besides this, all trees are very impatient of changes in the water-content of soils where they have become established. If the water is increased about their roots by damming, or if by draining it is taken away from them, they invariably suffer, and many species will never recover from a shock of this sort or live long enough to adapt themselves to new conditions. We apprehend that Mr. Rogers is correct in attributing the destruction among the Youngstown Hemlocks to the hand of man rather than to the pecking of birds.

Plant Names of Indian Origin.—IV.

PIPSISSEWA, or **PIPSISEWAY** (*Chimaphila umbellata*).—This is a word of Cree (Algonk.) origin, and, giving the letters the value that they have in English, should be spelled *pisisiwayoo*. It means "he reduces it to very small particles." In Algonkin grammar, an inanimate object (such as a plant, for example) cannot be the subject of an active verb, and, since, in the word under consideration, the agent is an animate being, the name must have been transferred to the plant from that of some Indian medicine man who had obtained a reputation from his use of the herb as a lithontriptic in the treatment of gravel. The name, therefore, belongs to the same category of words as Joepye, or Jopi, which was applied in New England to *Eupatorium perfoliatum*, from an Indian so called. This name is apparently a corruption of a word meaning "he makes liquid hot," alluding to this Indian's use of hot infusions of the plant in order to induce profuse perspiration in the treatment of typhus.

POWITCH (*Pyrus rivularis*).—A Chinook Jargon word often used with the adjunct tree. It is from the Chinook name of the tree, *pówish*, or *páwutsh*.

POKE (*Phytolacca decandra*).—An abbreviation of Powhatan *pokan*, or *pokone*; the same word as Puccoon, *q. v.* The name as applied to *Symplocarpus foetidus* is English, and the application of it to *Veratrum viride* is due to the latter being confused with the former, owing to the fact that the two plants often grow in company, and, to the unpracticed eye, bear a slight resemblance to each other in early spring when their leaves first appear. Hence both have received the same popular names.

Puccoon (*Lithospermum canescens* and *Sanguinaria Canadensis*).—From Powhatan (Algonk.) *pokone*, which is from (or from the same root as) an Algonkin name for "blood." Strachey (*Travels into Virginia*) describes "Pocones, a small root that groweth in the mountains, which being

dried and beat into powder, turneth red," etc.; and his editor (R. H. Major) notes that this is the "*Anchusa Virginiana* of Linnæus," quoting from Plukinet: "*Puccoon indigenis dicta quâ se pingunt Americani*." Clayton's *Flora* assigns the name to *Sanguinaria*. In the north it has generally been given to *Lithospermum canescens*, though it must be regarded as a general name for plants that yield a red dye.

POTATO (*Solanum tuberosum*).—Through Carib-Span. *patata*, from Taino (Haytian Carib) *batata*, *Batatas edulis*, from which the name seems to have been transferred to the tuber now so called by John Gerard, "because," as he says, "it hath not only the shape and proportion of [sweet] Potatoes, but also the pleasant taste and virtues of the same" (*Herbal*, p. 927).

SEGO (*Calochortus Nuttalli*).—A Pai Ute word, generic with these Indians and others of the same (Shoshonean) linguistic stock, for edible bulbous roots. The word is sometimes spelled Sago.

SENEGA, or **SENEKA**.—*Polygala Senega*, from the use of its root as a remedy for snake bite among the Seneca Indians, attracted the attention of Dr. Tennant, of Virginia, in 1734, who brought it to the notice of Dr. Mead, of London, in 1738. It was at that time called *Senega rattlesnake-root*. If, as is sometimes stated, the plant was so called after the Seneca Indians, the word is not of aboriginal origin, since the name by which they are known in English is a corruption of one applied to them by the Dutch settlers, their Iroquoian appellation being *Tsinontowanahaka*, "inhabitants of the great mountains." Charlevoix, however (1720-22), speaking of the name of the plant, says: "C'est apparemment le nom que lui donnent quelques sauvages"; and Clayton (*Flor. Virgin.*, 1743) says: "*Seneca Indis Pensilvan.*" Clayton's statement would make the word either Iroquois or Algonkin. If Algonkin, it belongs to the Delaware dialect, and is either from *'sinnegayoo*, "it is stony," or an abbreviation of *'sinnegepin*, "stony root," alluding to the hard knotty character of the plants' root-stocks, the medicinal part. Again, Adair (*Hist. of American Indians*, 1775) mentions the word *seneeka* as the Cherokee name of the "fern snake-root" (*Botrychium Virginicum*?). The Cherokees belong to the Iroquoian family. The true origin of the name Senega, or Seneca, is therefore doubtful.

SALAL, or **SALLAL** (*Gaultheria Shallon*).—A Chinook Jargon word, from the last two syllables of *klkwu-shála*, the Chinook name of the fruit of the plant.

SASKATOON, or **SKATOON** (*Amelanchier Canadensis*).—A corruption of eastern Cree (Algonk.) *misâskawatomin*, the fruit of the *misâskwa*, a word meaning "it is much wood," or "entire wood," which may allude to the quantity of wood available for making arrows that the tree yields. The wood is highly prized by the Crees for this purpose, as well as for making pipe stems.

SAVOYAN (*Galium boreale*, *G. trifidum* and *Coptis trifolia*).—From Algonk.-French *savoyanne*, formerly *tisavoyanne*, from Micmac *tissawhianne*, "skin-dye." The plants above named were used by the Indians of Canada for coloring articles which they made of prepared skins.

SKOKE (1) (*Phytolacca decandra*).—From Natick (Algonk.) *m'skoki*, "red," "bloody," alluding to the color of the juice yielded by the fruit. (2) *Symplocarpus foetidus*. The name, as applied to this plant, is an abbreviation of Delaware (Algonk.) *skwâkwînsh*, "skunk-weed." Skoka is a variant of the name.

SOROL (*Dasyliion Texanum*).—Through Spanish, from Aztec *sololin*, a word compounded of *sol*, "linen," and *tolin*, "bulrush," from the linear leaves of the plant, and, probably, the economic use made of its fibre.

SQUASH (*Cucurbita Melopepo* and *C. verrucosa*).—An abbreviation of Narragansett (Algonk.) *askútasquash*, plural of *askútasq*. "Askútasquash, their vine apples, which the English from them [the Narragansetts] call squashes" (*A key into the language of America*. Roger Williams, 1643). Both the first and last syllables of the word belong to the

same root, meaning "immature," "unripe," "green." From *askul*, the stem of *askutu*, "it is immature," "it is green," with the formative suffix *asq*, we have *askulasq* as the name for a cucurbit that might be eaten while in a green or unripe state.

"Whereas the Pompion is never eaten till it be ripe, these [squashes] are never eaten after they are ripe" (Beverly's *Hist. of Virginia*).

TACAMAHAC (1) (*Populus balsamifera*).—A West Indian (Aruban?) name for a balsamic resin derived from *Elaphrium tomentosum*, transferred to a resin produced by the Balsam Poplar, and then to the tree itself. (2) (*Larix Americana*). As in the preceding case, a transfer to the tree of the name given to a balsamic turpentine yielded by it, and used medicinally for the same purposes as the tacamahac of commerce, the properties of which are analogous to those of the turpentine.

New York.

W. R. Gerard.

The Oaks at Paxtang.

"BETWEEN South Mt. and the Endless Mountains lies the most considerable body of valuable land the English are possessed of . . . This valley is everywhere enriched with limestone. The Endless Mountains come next in order, ridges with even tops and nearly of a height, and to look into the lower lands is but, as it were, into an ocean of woods, swelled and depressed here and there by little inequalities, not to be distinguished one part from another any more than the waves of the ocean."—*Analysis of a Map of the Middle British Colonies in America*, by Lewis Evans, Philadelphia, 1755.

A remnant of the once immense Appalachian forest survives in the venerable Oaks at Paxtang, Pennsylvania, that curiously enough owe their preservation to the very men who made the first clearing in the "ocean of woods" covering that part of the Great Vale which extended from the Schuylkill to the Susquehanna, and known as the Lebanon Valley. The land where they settled, at the western end of the Lebanon Valley, a few miles south of the Endless Mountains, and not far from the Susquehanna, formed part of the disputed territory bought from the Shawanese in 1696, but was not finally ceded to the English until 1736. Years before this last treaty was signed John Harris had established his trading-post on the river, and of several settlements made by Scotch-Irish Presbyterians, one of the earliest was the then frontier settlement of Paxtang, in a minor depression or "inequality" of the valley.

By 1732 there had been such an increase in numbers at Paxtang, and Derry, ten miles eastward, that the congregations united in calling the Rev. John Bertram as joint pastor, and for a time each congregation worshipped in its own log meeting-house. The one at Derry satisfied its people for generations, but the primitive structure at Paxtang was replaced under the energetic ministry of the celebrated Parson Elder by the existing stone church, whose corner-stone was laid in 1740. Lineal descendants of the founder and builders compose most of its present congregation.

The land originally granted to the church consisted of one hundred acres, at half-pence sterling rent. This acreage was afterward reduced to twenty, and at present the church holding does not exceed eight acres in extent. It lies near the crest of the northern slope of the valley, and except for the portions occupied by the parsonage and grounds, the myrtle-covered graveyard, and the church, with its surrounding open space, is entirely in woodland. The woods are of mixed species and not at all noteworthy, except for the Oaks, which literally overshadow the other trees to such an extent that they form no part of the impression. There are six White Oaks, with trunks ranging from more than three to nearly five feet in diameter. The largest one, the subject of the photograph reproduced on page 295 of this issue, measures four feet eight inches, and stands not far from the front entrance to the building.

Two others are near the lower margin of the woods, and another, near the graveyard, screens the silent past from the too close approach of the busy present, which with house-lots and avenues touches the very border of the church enclosure.

From the margin of the woods there is a beautiful outlook into the valley over the surrounding country, and across the river to the broken spurs of the South Mountains, known as the York Hills. While the valley itself has developed into a succession of suburban villages, country seats and model farms, the Oaks, and the church they surround, have changed little since colonial days. The church is built of limestone, which does not ring much harder than the mortar cementing its blocks, and though the interior has been remodeled in accordance with modern ideas, the exterior was fortunately left intact, and preserves the uncompromising severity of its original lines. John Bartram, in his journeys through the Great Vale, often passed close to the Oaks, but it is doubtful if he ever lingered at Paxtang, as he had no love for the Scotch-Irish, and the only feeling he held in common with that fighting race was the wish "to bang the Indians stoutly."

In 1763 the Oaks looked out over a turbulent scene, as the Paxtang Rangers, disregarding the protests of their venerable Parson Elder rode off to Conestoga to deal punishment to the Indians who they thought had been treated too leniently by the authorities. The leader of this expedition was the same Capt. Smith who, twelve years later, and within ten days after the news was received of the battle of Lexington, had ready armed and equipped for service the company that was the second to reach Boston from south of the Hudson. This same company formed part of Arnold's expedition to Canada, and some of the members never returned from the assault on Quebec.

Generation after generation has passed out from under the shadow of the Oaks into the world, and the recent Scotch-Irish Congress, held in Harrisburg, has drawn attention to the veneration with which this church is regarded, a feeling intensified by the unchanged state of its immediate surroundings, and especially by the presence of its noble Oaks.

Harrisburg, Penn.

M. L. Dock.

Foreign Correspondence.

London Letter.

A FARM SCHOOL.—The present Duke of Bedford takes a keen interest in the agriculture and market-gardening of this country. Several years ago he established in Woburn, Bedfordshire, an experimental fruit-farm for the purpose of demonstrating new methods of culture and bringing into notice good varieties of all kinds of hardy fruits suitable for cultivation by farmers and others. He has lately added to this generous gift by placing at the disposal of the County Council a farm of 275 acres close to the Woburn fruit-farm, and has erected lecture-rooms, dormitories and other accommodation for the education of boys in the science and practice of farming. Every branch of farm and garden practice is taught by precept as well as by practice. The boys are granted free scholarships by the County Council; in other words, they are to be taught and housed free of charge for a period of two years. They are selected from the sons of agricultural laborers and small farmers. This school-farm, which is modeled on the lines of similar institutions on the Continent, is said to be the first of the kind ever established in this country.

SEEDLING ORANGES.—An interesting report by Mr. H. J. Webber, to the United States Department of Agriculture, dealing with the reproduction of varieties of Orange and other members of the Citrus family in Florida, is reprinted in *The Gardeners' Chronicle*. It is noteworthy on account of its setting forth that the varieties of Citrus are reproduced true from seed, in opposition to the general belief that good commercial varieties of Orange, Lemon, Lime, Shaddock,

etc., can only be reproduced by grafting. I have been informed that the inferiority of the oranges sent to market from some of the islands of the West Indies is due to the neglect of the cultivators to perpetuate good varieties by means of grafting, relying only upon seedlings. To remedy this state of things select varieties have lately been introduced, and planters have grafted them upon the inferior stocks already established. If Mr. Webber's statements are correct, and they appear to be based upon careful observation, all this trouble is unnecessary. With regard to other selected varieties of fruits of similar character to Citrus—that is, Apples, Pears, Persimmons, Peaches, etc.—seeds are useless as means of reproduction. We should like to hear at greater length the experience of growers of choice oranges in the southern states.

CALCEOLARIA ALBA.—This is a perennial herbaceous shrub which at Kew has grown from a seedling to a wide bush five feet high in two years. It is planted against a south wall which affords it a little protection in winter; whether it is hardier than this has not yet been tested. At the present time it is beautifully in flower, and it promises to make a display for about two months at least. Probably it might be grown dwarfed and utilized as a summer bedding plant. The stems are slender, erect, at first green and succulent, becoming brown and woody with age; the leaves are linear, two to three inches long, and they bear a few marginal teeth on the upper half. The flowers are in erect terminal panicles, strong shoots bearing panicles a foot long and six inches wide, with about one hundred expanded flowers, which are pure white, half an inch in diameter, the lower lip or "purse" being much larger than the upper, and folding over so as to present the appearance of round, inflated white bags. The species is a native of Chili, from whence it was first introduced by Lobb, who sent it to Messrs. Veitch, with whom it flowered in 1844. It appears to have been again lost to gardens until recently, when Herr Max Leichtlin reintroduced it. Cuttings of it strike quite freely.

ESCALLONIA PHILIPPIANA.—This beautiful hardy shrub was introduced from Valdivia in 1878, when it was described and figured by Dr. Masters in *The Gardeners' Chronicle*. It was discarded by some cultivators as being too tender, and by others as a poor unattractive shrub. A few, however, saw merit in it and kept it. I first saw it in full glory in a garden in Ireland three years ago, where it had grown into an elegant pyramidal bush ten feet high and was crowded with white star-like fragrant flowers in June. This year it has shown its full beauty at Kew, where it occupies two large circular beds skirting one of the principal walks. The shoots are elegantly curved, the leaves are small and they are almost entirely hidden by the myriads of white star-like flowers which clothe them from base to point. Their fragrance, too, is delightful. The effect of the Escallonia is heightened by the admixture of the flowers of *Liliums*, a common feature at Kew, almost every bed planted with low-growing shrubs having some species of *Lilium* growing happily with them. The Escallonia is not hardy in the north of England, but in countries where the winters are not severe it is an evergreen summer-flowering shrub of quite exceptional merit.

RHODODENDRON SNIRNOWIL.—*The Gardeners' Chronicle* for this week contains a life-size picture of a flower-truss of this Rhododendron, which was introduced from the Caucasus by means of seeds sent from the Botanic Gardens, St. Petersburg, to Kew in 1886. The plants at Kew flowered for the first time in the open air in May, 1893, but this year the flowers have been larger and more attractive. They are similar in size and general appearance to the flowers of *R. Catawbiense* and colored a soft rose-purple, with a few dull red spots on the upper segment. The species is remarkable in having the under side of the leaves clothed with a thick felt-like layer of pale yellow wool, which becomes dull brown as the leaves get old. The plant grows slowly, branches early, is evergreen and quite hardy, and it possesses a special interest for the cultivator

of Rhododendrons. As a breeder it is likely to prove valuable, and that it will cross with the garden Rhododendrons has already been proved at Kew, where there are now seedlings raised from an undoubted cross between it and some good varieties of the popular *Catawbiense* hybrids.

WATERER'S SPIRÆA.—The most attractive shrub at Kew in July is this beautiful variety of *Spiræa Bumalda*. Beds of it twelve feet across in conspicuous positions on the lawns are covered with large flat trusses of glowing crimson flowers. With a little attention this effect may be retained till the autumn, the attention needed being nothing more than the removal of the old trusses as they fade. If these are cut away daily—"delightful occupation for the young ladies after breakfast," says my friend Mr. Waterer—the lateral shoots continue to push up fresh heads almost till the frost comes to stop them. As a pot-plant we have not found this *Spiræa* worth the trouble, but in beds and borders it has proved itself worthy of the recommendation given to it by its introducer, who sent it out as the best summer-flowering hardy shrub introduced in recent years. It is easily propagated from soft summer cuttings or by division.

ROSE, CRIMSON RAMBLER.—The display made by this grand climbing Rose has been exceptionally brilliant for the past three weeks. Planted in a border among tall herbaceous plants, with a pole twelve feet high to support the stems, which are held loosely up by a kind of wire crinoline fixed to the pole, the shoots have formed a massive sheaf of rich green foliage and large clusters of flowers which can be seen "a mile off." For pillars or as a clothing to picturesque tree trunks no Rose can be more suitable. It must be planted in a rich deep soil and be kept watered in dry weather. The old shoots—that is, those that flowered last year—should be cut out or thinned out, so as to make room and throw vigor into the new shoots which are pushed up from the base, and grow to a height of ten or twelve feet in a few weeks. These stout Willow-like shoots produce the finest bunches of flowers. This thinning treatment is good for all the climbing Roses if abundance of bloom is required. I hear that some nurserymen supply grafted plants of this Rose; they are almost as useless as grafted Raspberries would be. The suckers pushed up from below the soil every year are the life of this Rose.

London.

W. Watson.

Cultural Department.

Vegetable Notes.

WE have tried a number of the round-seeded early Peas, but find none better than Alaska. Besides being as early as the earliest, it is, like all blue-seeded varieties, superior in flavor and makes a better appearance on the table. Kentish Invicta resembles it, but is a few days later. If sown when Alaska is above ground it comes in just right for succession. The only value round-seeded Peas have is their earliness. The wrinkled varieties are always preferred on account of their superior table qualities. Nott's Excelsior and the Chelsea, among dwarf kinds of the American Wonder type, are the best we have grown. Passing to bush wrinkled varieties, in point of earliness Station Pea has proved a worthy successor to the old Alpha. This variety of late years has been uncertain. Without doubt, Horsford's Market Garden and Bliss's Abundance are the two best early midseason Peas of medium height. Juno follows them about ten days, and even in date with Champion of England. No word of praise is necessary for old Champion of England, still the standard of excellence among large green-seeded kinds. It is always good.

We have again followed the transplanting system for our Onion crop in preference to sowing the seed in drills, and we are more convinced than before that it is the best plan for private places. Half an ounce of seed sown in a box in the greenhouse or in a hot-bed in February (or even in the autumn and held over in cold frames) will, when transplanted into flats and hardened in cold frames, plant quite a large plot. A foot apart for the rows and three inches between the sets is a good allowance for distance; and if the ground is rich the onions will be exceptionally large. Prizetaker is an excellent

red-skinned variety; Southport Yellow Globe is also a splendid onion. Large onions are not always in demand. Small varieties ripen early and make a convenient size for boiling. Adriatic Barletta is a very good small onion, and sown thickly in drills it comes in splendidly for pickling.

The Mohawk is a very early and hardy Snap Bean. It is flat-podded, and, like all of this kind, is not equal in table qualities to the round-podded varieties, which are not so hardy. We have a new one, the Warwick, which bids fair to rank high in quality for an early bean. The Lyonnaise is also new to us. It is a poor, rambling grower, and not very prolific, but the beans are of excellent quality. To those who prefer a wax bean, the Valentine Wax is a splendid article.

Strawberries have had a favorable season. None excel Bubach No. 5 in productiveness, or Triomphe de Gand in quality. Parker's Earle is healthy and wonderfully prolific. The berries have a sharp, pleasant flavor. It is probably the best all-round berry for family use. Salamander and Mignonne Lettuce stand better than any, and both make good solid heads.

Wellesley, Mass.

T. D. Hatfield.

and become a feature of the scenery if the flowers were not so persistently destroyed.

Campanula persicifolia.—This beautiful Bellflower grows wild in grassy and open deciduous woods in most countries of Europe. It delights in partially moist ground around springs and rivulets or on rocky hillsides, where it grows in scattered tufts among the grass. The species itself has pale blue flowers, but there is also a pure white variety common in a wild state. The stems are simple, bearing a few very large terminal and axillary flowers at the top. The root-leaves, which give the species its name, are broadly lanceolate, slightly acuminate; the stem-leaves, on the other hand, are quite small, linear-lanceolate, very dark green. There are double and semidouble varieties with white or blue flowers, common in gardens, but the species itself and its simple white variety are the best for general use. They may be grown in rich soil in thickets and shrubberies or in open spaces in woods. Both are readily increased by means of seeds, and should be raised in a nursery-bed to be planted out the second year.

Convolvulus tricolor.—This dwarf and floriferous annual



Fig. 40.—Oaks in the Churchyard at Paxtang, Pennsylvania.—See page 293.

A few Good Garden Plants.

Hesperis matronalis.—The many varieties of the Dame's Rocket, as this beautiful plant is often called, are well known to everybody. Not so the species itself, which, however, is both more attractive and graceful than any of its popular forms. It grows to a height of about two feet, bearing loose terminal racemes or panicles of violet-red flowers, which are very fragrant, especially in the afternoon and evening. The stems are slender and covered with bright green leaves from six to eight inches long, mostly lanceolate, radical ones stalked and largest, those of the inflorescence bracteate. It flowers late in spring, in May or June, and is especially effective when running wild in old gardens and orchards, or in groves and hedgerows. This is one of the most easily naturalized plants, and it increases rapidly by means of self-sown seeds where they are allowed to ripen. In the vicinity of New York it grows in certain parts of Bronx River Park, where it would rapidly spread

deserves a more general culture, as it is one of our most beautiful summer-flowering plants. It is now seldom seen anywhere, and if reintroduced would be considered a novelty by many. For summer bedding several of the hardy annuals are far superior to many of the greenhouse plants grown for this purpose, and *Convolvulus tricolor* is among the best of them. The flowers are produced from the axils of the leaves in great abundance throughout the summer. The corolla measures nearly two inches across, the limb being of a beautiful blue, the throat bright yellow and the intermediate part pure white; the flowers are beautiful and effective. The leaves are chiefly ovate or spatulate on the lower half of the stem, rather thick and hairy. The stem grows a foot or more high, and when the plant is used for bedding purposes it should be pinned down to the ground so as to form a uniform mat of leaves and flowers. The seeds should be sown on the spot very early in spring.

Arnebia echioides.—Few hardy herbaceous plants are more

showy or desirable than this. It belongs to the Borage family, and is nearly allied to *Lithospermum*, and although very easy to grow it is comparatively rare, except in continental Europe. It is a native of Armenia, but, nevertheless, perfectly hardy far north. The habit is quite dwarf; it seldom grows more than a foot high, forming loose tufts which for a long time in summer are covered with the large pale yellow flowers marked with five black or maroon spots in the same manner as *Nemophila maculata*. They are about three-quarters of an inch in diameter and produced in loose terminal spikes. This species grows best in a half-shady position in rocky or gravelly soil. It may be grown with success in rockeries in the shade of light-foliaged trees. The propagation is best effected by cuttings of the root or by seeds or division. The seeds should be sown in a warm frame or cool greenhouse early in spring, and the young plants may be planted out permanently the same summer.

Streptosolen Jamesonii.—This is well known as a winter-flowering greenhouse plant, but it is an exceptionally valuable bedding plant also, producing an abundance of showy flowers throughout the summer if properly grown. By means of pinching it may be kept very dwarf and compact, the young shoots producing flowers constantly as long as a healthy growth is maintained. It is appropriate in beds in company of such plants as the *Cupheas* and *Browallias*. The plant will grow several feet high if not checked; it has rather small ovate, deeply veined, shiny green leaves and large terminal corymbose panicles of orange color, more or less suffused with scarlet. *Streptosolen* may be grown in the same manner as the well-known Cigar-plant (*Cuphea platycentra*); it is propagated in a cool greenhouse early in spring by means of herbaceous cuttings, which root freely. The plant will be most satisfactory if grown in a rich and moist soil in an open and sunny position.

New York.

N. J. R.

Campanula rotundifolia.—Harebells swinging to and fro from invisible seams in rocky cliffs always charm the eye with their airy grace and exquisite color, and they are highly satisfactory for indoor decoration as cut flowers. No matter how wilted they may be they quickly revive in warm water, and every bud develops with conscientious fidelity, lasting for weeks with increased delicacy of color. For cultural use, however, as a house plant, *Campanula rotundifolia* is a failure; all its growth is twisted, distorted and abortive. When planted in a pot and set on a bracket for veranda use it is unsurpassed, for it will bloom there from the last of June, through the entire season, if the seed-pods are not allowed to mature. The marvelous strength and elasticity of the slender stems render them proof against summer gales, heat and neglect. In selecting plants for this use look around the sloping base of ledges where stray specimens have well-developed roots, and where their natural soil can be secured for potting. Harebells take kindly to artificial rock-work and will grow in any soil, but will not succeed with level culture; a certain freedom from the ground must be given, for the lovely plant revels in movement, and it needs the opportunity to sway "just as the breezes come and go."

Pittsfield, Vt.

G. A. Woolson.

Seasonable Flower Notes.

SEEDS of Pansies to be used for bedding next spring should be sown now. We find the *Lyonnaise Perfection* a good strain at a moderate price. The flowers are large, and there is a considerable range of coloring. The seed should be sown lightly in drills. A good plan after sowing is to put a covering of light litter over the bed until the seedlings are up; this keeps the ground moist and also prevents the soil being washed when watering. All small seeds sown during summer-time come up better when treated this way. *Myosotis alpestris* should also be sown now. It is the best *Forget-me-not* for early spring flowering. In its native country, the Alpine regions, it is a perennial; with us it is little better than an annual, and for bedding purposes should be treated as such. Seedlings should be ready for transplanting by the end of August and put in nursery-beds about six inches apart. They will make good stools before winter sets in. *M. palustris semperflorens* is another good *Forget-me-not* well worthy a place in the spring garden. It is about two weeks later in blooming than *M. alpestris*. We used it as an edging to a bed of *Silene pendula*, and coming into bloom at the same time it made a very pretty contrast. This species is a true perennial, creeping and rooting as it goes. In a moist and rather shady situation it will continue in bloom all summer. *S. pendula* is among the showiest of spring bedding plants. It has often

proved hardy with us unprotected, but whenever we have sown it in a cold frame and protected it as we do Pansies, not so much from frost as from alternate freezing and thawing, we have lost the greater part of our batch. We find we have better success by sowing in a box in the greenhouse in late January. Two or three hundred seedlings transplanted in boxes, and hardened on shelves in a cool house, may be put out into cold frames in March and bedded out when favorable weather comes.

Hybrid Primroses are among the most charming of spring-flowering plants. Years ago we had a large number of good varieties, which were used to decorate the spring garden. Although most effective when in bloom, they are not well adapted to the bedding system. When transplanted in spring their rather fleshy roots do not take hold of the soil quickly enough to support a somewhat ample leafage, so that whenever the sun shines directly upon the plants they wilt badly. They do best when permanently planted, and are very effective on moist shaded slopes. A few plants set out in the woods near a spring eight years ago bloomed abundantly this season. Our original lot are nearly all gone. They seemed to lose constitution by frequent removals, as when used for spring bedding they had to make way for summer bedding, to be moved back the following spring. We have raised a new lot this spring, and intend to set the plants in the autumn when summer bedding plants are past; there should thus be time for them to become established before winter sets in and they should stand better the coming spring. Along with the hybrid Primroses come plants of *Primula japonica*. *P. denticulata capitata* and *P. cortusoides* will be tested for their value as spring bedding plants.

Foxgloves, Hollyhocks, Canterbury Bells and Sweet Williams are now ready to plant in nursery-beds. The two first-named make good pot-plants for piazza decoration, and with *Deutzia gracilis*, *Astilbe japonica* and Chinese Hydrangeas make effective groups. These hardy plants have the advantage over tender plants in that they bear exposure better during the cool spring months than tender plants like Fuchsias and Pelargoniums.

Coreopsis *Drummondii* has proved a first-rate winter-blooming plant for cut flowers. In order to have good plants ready to take into the greenhouse when cool weather comes we sow a little seed now out-of-doors. Toward the end of the month a little good Mignonette-seed should be sown indoors for winter flowers.

Wellesley, Mass.

T. D. Hatfield.

Hardy Plant Notes.

ONE of the handsomest hardy perennials in bloom at this time is *Spiraea palmata*. When in a favorable situation it increases rapidly and small plants quickly develop into bold, showy clumps. The most complete success is secured with the plant here only when it is set in a slightly damp place and a fairly rich soil, where it makes stems three or four feet high, which carry large broad clusters of rosy crimson flowers. If it is planted in the border it must be watered freely or it will make a miserable plant not much more than one foot in height. Our plants do nicely in a moist spot in the rock-garden, where they are shaded from the sun during the hottest part of the day. There is a good form of this plant with white flowers. A few weeks ago a bed ten feet in diameter of the American Goat's Beard, *S. aruncus*, was an imposing sight. This plant is the noblest and boldest of the herbaceous species belonging to this genus. It is of easy cultivation and readily accommodates itself to almost any situation or soil. Our largest groups of this plant are grown in an exposed position in good rich soil. They grow five feet or more high and produce large compound panicles of white flowers. Other plants grown under large Oak-trees, where they are shaded nearly all day, do not grow as tall as those in the open, but they blossom well and they have compact panicles of flowers. *S. astilboides* is a good Japanese plant that is perfectly hardy here and makes a good border plant. It is about two feet high and the whitish flowers are produced in stout, erect, spicate panicles.

Astilbe Chinensis is just beginning to open its flowers. It is a fine perennial, growing freely in a rich, moist soil. It has stout, erect panicles, two feet in height, of dull rose-colored flowers, which are held well above the dark green foliage. This species blossoms later than *A. japonica*.

The Speedwells are excellent border plants, and from early spring until fall some species or good variety embellishes the borders or rockeries. Quite a number of species are blossoming now, the following the most distinct and decorative ones: *Veronica incana*, a distinct plant with silvery leaves, its flower-

stems from twelve to fifteen inches high, the blue flowers produced in showy racemes. *V. longifolia*, a common garden plant, showy and effective in bloom; it is about two and a half feet high and has long blue racemes of flowers; several distinct forms of this plant are grown here—one form has rose-colored flowers; another is pubescent, while another is glabrous. The best variety of this species blossoms a week or two later and is known as *V. longifolia*, var. *subsessilis*. *V. spicata* makes a neat and compact border plant, growing from one foot to eighteen inches high, and has a short, dense spike of bright blue flowers. The white-flowered variety of this species blossoms at the same time and makes a fine contrast with the numerous blue-flowered kinds. They thrive in a rich open soil and do best away from the shade of trees.

Salvia sylvestris makes a compact plant three feet high and has showy spikes of deep purple flowers which last in good condition for several weeks. *S. numerosa* is a stronger-growing plant with flower-spikes of a purplish color. *S. sclarea* is a distinct species three feet high, and its stems are thickly clothed with long, ovate, wrinkled, hoary leaves. The flowers are in panicles and the corolla is of a bluish white color, while the calyx is white. In a sunny place in the border those *Salvias* grow freely. They produce an abundance of seeds, from which young plants are easily obtained.

The best of the Skullcaps in bloom now is *Scutellaria Baicalensis*, better known in gardens as *S. macrantha*. This plant is valuable, as it produces an abundance of dark blue flowers for many weeks during the summer months. It is a Siberian plant, about a foot in height, or slightly more, and has sessile, lanceolate obtuse leaves. The individual flowers measure about an inch in length and are borne plentifully in simple racemes. Near the edge of the border it makes a neat plant and grows easily in good enriched garden soil. The alpine Skullcap spreads quickly, but if kept within bounds it makes a showy plant. It is procumbent in habit and has short spikes of purple flowers. Another species well worth growing, having a neat habit and showy flowers, is *S. scordifolia*. The seeds of the plants now in bloom here were received from Sweden last year. It is like a good *Brunella*, but has much larger and more showy flowers, which are borne in a dense short spike. It is about a foot in height and grows either in a sunny position or in the shade.

Many of the Catnips are too weedy for ordinary border plants, but an exceptionally good one now in bloom is *Nepeta macrantha*. This is a handsome species, and has as showy flowers as some of the Pentstemons. The square stems are more than a yard high and sparsely clothed with opposite lanceolate serrated leaves. The flowers are in long loose racemes a foot in length. The corolla is the showiest part of the flower, and measures an inch in length and half an inch in diameter at the widest part, and is of a purplish color. *N. grandiflora* is the next showiest species of this genus now in bloom.

The Chinese Bellflower, *Platycodon grandiflorum*, has just begun to open its large bell-shaped flowers. This handsome plant has all the good qualities that a good hardy perennial plant requires. It has a good habit, with stout erect stems which need no support to keep them upright, and has clean healthy foliage, with large open showy flowers, deep blue, or sometimes nearly white. It is perfectly hardy and grows easily in any well-enriched garden soil. Our largest plants are about a yard high, but the height of the plants varies. The flowers are produced in clusters at the ends of the branches, but they do not all open at the same time. The flower measures from two to three inches in diameter. This *Platycodon* is easily raised from seed, and if sown early in spring the plants will blossom the first summer when they are about six inches high. This plant is also known as *Campanula grandiflora*, and is a native of China and Japan.

Botanic Garden, Harvard University.

Robert Cameron.

The Best Dutch Bulbs.

THE Dutch Bulb Society lately took a vote on their choice of the best varieties of Hyacinths, Tulips, etc., with the following result:

Six white Hyacinths (single and double).—La Grandesse, Grandeur à Merveille, Mont Blanc, L'Innocence, Madame van der Hoop and Baron van Tuyl.

Six blue Hyacinths (single and double).—Grand Mattre, King of the Blues, Charles Dickens, Queen of the Blues, Czar Peter and Regulus.

Six rose-colored Hyacinths (single and double).—Gigantea, Moreno, Noble par Mérite, Roi des Belges, Lord Macaulay and Gertrude.

Three Hyacinths, yellow and orange (single and double).—Ida, King of the Yellows and Sonora.

Three purple Hyacinths (single and double).—Haydn, Sir William Mansfield and Adelina Patti.

Twenty-four Tulips (early single).—Pottebakker (464 votes), La Précieuse, Keizerskroon, Vermilion Brilliant, Proserpine, Joost van Vondel, Rose Griselin, La Reine, Rosa Mundi, Chrysolora, Yellow Prince, Duchesse de Parma, Thomas Moore, Kanarienvogel, Wouwerman, L'Immaculée, Duc van Thol (scarlet), Ophir d'Or, Zilveren Standaard, Nelly, Rose Luisante, Rembrandt and Gouden Standaard, with 189 votes.

Twelve Tulips (double).—Murillo, Tournesol, Imperator rubrorum, La Candeur, Salvator Rosa, Tournesol (yellow), Rose Blanche (see colored plate *Revue de l'Horticulture Belge* of June 1st), Rex rubrorum, Vurbaak, Mariage de ma fille, Alba maxima and Raphael. The first had 461 votes, the latter 198 votes.

Correspondence.

The Oak Pruner.

To the Editor of GARDEN AND FOREST:

Sir,—I have at my home in Auburndale a beautiful Oak afflicted by some disease which causes the small branches to fall to the ground. Can you tell me what the matter is and suggest treatment?

Boston.

E. P. S.

[Our correspondent's Oak is afflicted with the larvæ of the Oak Pruner, *Stenocorus putator*, which is unusually abundant this year in the neighborhood of Boston. In its adult state it is a slender long brown beetle, sprinkled with gray spots, and varies from four and a half inches to six-tenths of an inch in length. It lays its eggs in July, each egg being placed close to the joint of a leaf-stalk or of a small twig near the end of a branch of an Oak-tree. The grub hatched from the egg penetrates the following season to the pith of the branchlet and continues its course toward the body of the tree, and by devouring the pith forms a cylindrical mine several inches long in the centre of the branch. Having reached its full size it cuts off the branch at the lower end of its burrow by gnawing away the wood from within, leaving only the ring of bark untouched; then, retiring backward, it stops up its hole in the transverse section with the fibres of the wood and awaits the fall of the branch, which is broken off and precipitated to the ground by a slight breeze. The presence of the grub is not discovered until the branch falls, and there is nothing to do but to gather up the branches as fast as they fall and burn them, and in this way prevent the spread of this pest.—ED.]

In the Mountain Trails.

To the Editor of GARDEN AND FOREST:

Sir,—I have just returned from a three-weeks' drive through the same mountain region near here where we had journeyed ten years ago, and I remember that we then considered the popular novelist's pictures of the moonshine regions and picturesque backwood characters had not been overdrawn. Such utter shiftlessness and entire absence of concern for anything beyond the merest animal existence could only be conceived by one who had passed the windowless huts from which poured out droves of half-naked, shock-haired children, "jest fer to see the stranger"; the few weedy fields, almost hidden from sight by the brush in the fence corners; the scrub cows and razor-backed hogs that never saw pasture or pen; these, together with the absence of schoolhouses and churches, told of the general do-nothingness of the population.

But ten years have wrought great changes, and during a drive of more than four hundred miles through one of the most out-of-the-way regions in America, we saw but a half-dozen windowless houses and fewer barefooted women. We saw orchards dotting the hillsides, enclosed yards about most of the houses, and not a few comfortable and roomy dwellings, built with some faint pretensions to beauty. In the larger valleys there was a sprinkling of fairly well-tilled farms, and a growing taste for the beautiful as expressed in occasional shrubbery and flowers.

This last surprised us above all else. Ten years before we had observed almost no attempts at flower-gardening, and there are still some districts with no flowers but the wild ones,

and many more where the attempts at ornamental gardening are of the crudest. Nevertheless, the growing taste in this direction was marked. It was interesting to observe the evolution of the flower-garden. The first plant cultivated was inevitably a Zinnia, the next was usually a Castor-bean, and after these a considerable variety was seen about the more ambitious houses. I never saw as many Zinnias before, nor such poor ones. If there are any who have a passion for Zinnias, these enthusiasts would have their love put to a severe test if compelled to gaze for three weeks, as we did, at ragged single Zinnias, dull in color and shaggy in outline. We passed at least a hundred homes where the sole flowers were these forlorn, neglected things that had less beauty than the Mullein by the roadside. Nevertheless, some one had sowed them, some one had hoed them, some one had taken pleasure in them, and it may be that they will be forerunners of much garden beauty in the future. If so, welcome even the Zinnia.

Uncle Sam sends his mail-bags everywhere. On the roughest mountains we passed the carrier with mail-bags thrown over his saddle, or met the faster stage with the familiar letters, "U. S. Mail," painted in great letters upon the sides. The catalogues that our florists scatter broadcast all over the land in this way bear fruit even in this unpromising field. Once we were treated to a genuine surprise. We had been riding over roads so rough as to be almost impassable, and for two days we had scarcely seen an excuse for a flower, save those of Nature's planting. Suddenly we came to a house surrounded by a wide lawn. Long beds and borders were ablaze with scarlet and pink Geraniums, and gay Balsams, Heliotropes, Asters and Marigolds, and we stopped the horses to look long at the tempting beauties displayed by some one who is doing true mission work in teaching order, industry and love of the beautiful.

On the whole, therefore, the incipient efforts at ornamental planting, though small and weak, are yet encouraging in this remote and mountain-locked region, and, no doubt, the time is coming when the wilderness and the solitary place shall be glad, and the desert shall blossom as the Rose.

Pineville, Mo.

Lora S. La Mance.

Hardiness of Southern Pine.

To the Editor of GARDEN AND FOREST:

Sir,—About three years ago I obtained from North Carolina a dozen young plants of *Pinus palustris* and set them out in the spring. Unfortunately but one survived the transplanting, but your readers may be interested to know that this has proved quite hardy here where it has stood out for two winters, with no protection whatever, and has suffered no harm. Among other plants which are usually considered too tender for our winters, *Ilex crenata*, from Japan, has proved perfectly at home here, so has *Skimmia Japonica*, a broad-leaved, slow-growing evergreen. *Magnolia grandiflora* loses its foliage nearly entirely every winter, but the branches are always unburnt. For general planting it is never worth while to use trees or shrubs which are not sure to thrive, but it is interesting occasionally to have specimens of some striking sorts outside of the limit of their assured hardiness. Thus, *Aucuba Japonica* can usually be trusted here out-of-doors, and so can the beautiful Crape Myrtle, *Lagerstroemia Indica*.

Germanstown, Pa.

Joseph Meehan.

Winter Protection for Bush Fruits.

To the Editor of GARDEN AND FOREST:

Sir,—There are, perhaps, a dozen essential factors that go to make up the conditions of success with any one crop. But if one of these factors chances to be neglected, instead of reducing the resulting crop one-twelfth, as might seem to be the case, it may reduce it to zero. As if this were not enough, there is still the cost of production to be deducted. In other words, while the faithful observance of any one essential factor will not insure success, the neglect of any one may bring absolute failure. The Blackberry bushes on the Nebraska Experiment Station farm present a striking example of this truth at the present time. The past winter has been one of the mildest ever experienced in this section, yet rows of Taylor Blackberry, left uncovered for comparison, are killed to the ground, the canes presenting one continuous row of brown, until the new shoots sprang up from the root. Rows right beside these, which were laid down and covered with earth for protection, are alive and plump throughout and throwing out vigorous leaves and promises of fruit. In this case it is evident that while laying down and protecting the

canes does not insure a crop, the neglect of it does insure failure.

It is instructive to note in this case that it is not severe cold that causes the death of the canes, since the lowest point reached at any time during the winter was only five degrees below zero in January, and in no other month did it fall below zero. Comparing this with the temperature which the Taylor Blackberry endures in the eastern states, it will be readily seen that the injury must be assigned to some other cause. The most probable reason seems to be the excessive dryness of the soil and atmosphere during the winter months. Little rain or snow falls, as a rule, during this time, and uncovered canes are almost continuously exposed to drying winds. Even the winter protection afforded by laying down and covering did not suffice to bring the Red Raspberries through in such condition as to promise a crop, although the effect was noticeable in the greater proportion of living wood. The fate seems to be the same every winter so far as injury to uncovered canes is concerned. Heretofore none have been laid down, and the result has uniformly been a complete failure. It may be added, that having thus guarded against the drying winds of winter the even more trying ones of summer are to be encountered, and the problem of counteracting these is as yet largely unsolved.

Lincoln, Nebraska.

Fred W. Card.

Kansas Wild Flowers.

To the Editor of GARDEN AND FOREST:

Sir,—The hillsides and prairies of Kansas are decked with many beautiful flowers from April until October, and I have selected for notice a few which I think would be of the most interest to those who grow flowers for pleasure or profit. All of them are confined almost exclusively to the west and may be called Kansas plants. Some of them have been cultivated, but not to any great extent that I know of. I have seen a few in cultivation here, but for the most part their adaptability to cultivation in other localities is yet to be tested. All of the plants mentioned I value in the natural state, but many of them could, doubtless, be improved by cultivation and selection.

Anemone Caroliniana is a small daisy-like flower which dots the smoother prairie pastures with red, white and blue flowers early in the spring.

Callirhoe involucrata is usually found in sandy soil, and with its large reddish-purple mallow-like flowers and much cut leaves spread out on the ground gives the bottom-lands a very attractive appearance. [This plant is quite common in eastern gardens, where it blooms all summer, and springs up from self-sown seed year after year.—ED.]

Amorpha canescens, the Lead-plant, one of our small shrubby prairie plants, has been cultivated to some extent and is very attractive when in full flower. It is much branched from the root, and the fine compound leaves, covered with a gray pubescence, contrast well with the dense purple spikes of flowers with their golden-yellow stamens. [See vol. vii., p. 275.—ED.]

The *Oenotheras*, or Evening Primroses, are very abundant here and produce some of our largest flowers. Professor F. A. Waugh has already described them so fully that I will only call attention to his article in vol. viii., p. 253.

Gaura coccinea is a low-branched plant, six to twelve inches high, and bearing a profusion of small rose-colored or scarlet flowers, which have a pink-like fragrance. It is found in the more sandy bottoms.

Mentzelia ornata is one of the most showy of Kansas flowers, where it grows on the rocky hills of the western part of the state. The flowers somewhat resemble those of the Night-blooming Cereus; they open in the afternoon and evening, expanding their yellowish white petals some three inches. The plant is often called here the White Mound Lily.—[See vol. vi., p. 63.—ED.]

Townsendia sericea is one of the earliest composites of the state. The low plant is almost stemless, and the large white or pinkish flowers are almost on the ground on the hilltops which they adorn in April.

Helianthus petiolaris, the Sand-hill Sunflower, is one of the prettiest Sunflowers of the Sunflower state. It is much like the too common *H. annuus*, but more graceful, smoother, and the flowers are smaller and brighter.

Asclepias speciosa bears the largest flowers of any of our Milkweeds. It is a large-leaved, white, woolly plant with showy drooping umbels of purple flowers of the peculiar Milkweed form. It has a heavy sweet fragrance like most of the species of *Asclepias*.

Ipomoea leptophylla, the bush Morning-glory, is a peculiar and beautiful plant. Unlike most of our *Ipomoeas*, it is an

upright, branching, shrub-like perennial, growing from an immense woody root weighing from ten to one hundred pounds. The flowers are a pink-purple and about three inches long.—[See vol. vii., p. 436.—ED.]

Euphorbia zygophylloides is much like *E. petaloides* of the east, but is more densely and finely branched and covered with small white or pinkish flowers, which are useful for cutting, like those of *E. corollata*, or *Gypsophila paniculata*, to mingle with larger ones of a more positive color,
State Agricultural College, Manhattan, Kan.

J. B. S. Norton.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—Our little collection of shrubs and trees embraces nearly five hundred species and varieties, and, although at this season comparatively few of them are in bloom, yet I find that one can still gather from them large and beautiful bouquets for the decoration of the house and table. A vase in my room is filled with branches of white *Althea*, or *Hibiscus Syriacus*, and another is decorated with the graceful white plumes and pinnate foliage of Osbeck's Sumach, *Rhus semi-alata*, var. *Osbecki*, just coming into flower. This Sumach is not a shrub, but a tree of very rapid growth, and bids fair to attain a large size. Planted five years ago it is now fifteen feet in height, the main stem divided into two near the ground. It is very attractive at this time because of its conspicuous bloom and semi-tropical appearance, but will be even more beautiful in the fall when it puts on its lively coloring of red and orange. [Osbeck's Sumach is not yet in flower in the latitude of New York. It is a hardy and shapely tree here, but as there are no leaves on its larger branches it has not a compact appearance. It has also the drawback of throwing up suckers even at a considerable distance from the trunk. Its late period of flowering gives it a distinct value, but in limited collections there are trees which are preferable to it for general purposes.—ED.]

Parrotia Persica is now a beautiful young tree ten feet in height, clothed to the ground with dense and very elegant foliage. It is one of the finest specimen plants we have. Unfortunately, a web-worm has found it out, while its near relative, our native Witch Hazel, is untouched. It may be added that its flowers are not conspicuous, but that its autumn coloring is quite as brilliant as that of our native small trees. Although it comes from southern Europe, it is quite hardy as far north as New England. The *Fontanesia* spoken of some time ago is more attractive now than when in bloom, as every twig is furnished with small light green carpels, which contrast prettily with the darker green of the narrow leaves. Near-by, *Calli-carpa Japonica* is showing numerous small clusters of light pink flowers, very freely produced, and these will be succeeded by curious mauve-colored berries more showy than the flowers.

The wild garden is bright with tall red and yellow Lilies, masses of light blue and pure white Funkias and many other handsome flowers. *Heliopsis Pitcheriana* planted in a fence corner is a cheerful sight with its large, bright yellow flowers in generous profusion. This wild garden has a distant background of pink and white, double and single flowering *Altheas*, or *Hibiscus Syriacus*, with showy blossoms resting amid the cool green of their varnished foliage. In the foreground many *Platycodons* with their blue and white blossoms mingle with the Lilies and make a fine display. Here a tall, well-grown plant of *Cassia Marylandica* is at home and has attractive compound foliage and yellow flowers in axillary racemes and terminal panicles. It is four feet in height and comes up from the root every spring, only blooming in wet seasons. It grows in a wild form in our marsh, where it blooms profusely every year. The bright blue flowers of Lady Larpent's Plumbago, *Ceratostigma plumbaginoides*, are beginning to show themselves at the foot of the *Spiræa Anthony Waterer*, which is still blooming profusely. The ground in this wild garden is partly covered with *Asperula agurea setosa*, a delicate little annual, not showy, but very lovable with its clusters of small light blue flowers and refreshing perfume. Near-by is a blooming mass of lemon-scented Thyme, another inconspicuous plant whose fragrance gives it value.

Shepherdstown, W. Va.

Danske Dandridge.

Recent Publications.

The Nut Culturist. Illustrated. By Andrew S. Fuller. New York: Orange Judd & Co.

It is a pity that Mr. Fuller did not live a few months longer to see the publication of a book which he has had in preparation so many years. He was certainly one of

the pioneers in observing and experimenting on what is now recognized as an important subject, and which is destined to become, beyond doubt, an extensive industry in this country. Even now, however, the practical knowledge which we have of propagating our native nut-trees is not very large, but Mr. Fuller was the leading authority on this matter in the country while he lived, and his writings have done much to encourage experiments in the way of securing and planting improved varieties of our native nut-trees and of such imported species and varieties as can be grown profitably in this country.

This compact little treatise of 390 pages contains separate chapters on the almond, the beech-nut, the castanopsis, the chestnut, the hazel-nut, the hickory-nut and the walnut, and then there are brief accounts of many other miscellaneous nuts which are either found in the country or in our markets. Mr. Fuller believes that the best known of the walnuts—that is, the Madeira nut or Persian walnut, which has been in cultivation for many centuries in different countries and climates—can be grown with a little care in our eastern states as easily as our native butternuts. There are now acclimated specimens growing here and there which are hardy and productive, and from seedlings or scions of these we can experiment until we have a strain which would be perfectly trustworthy in this climate. A comparatively large space is given to the different varieties of hickory-nuts, including the pecan, and Mr. Fuller advocates the planting of Hickories as roadside trees, because they are quite as ornamental as any other trees and yield abundant crops. Indeed, in the introduction of his book Mr. Fuller makes a long argument in favor of using nut-trees for roadside planting. He sees no reasonable excuse for planting miles of Elms, Maples, Ashes, Willows and Cottonwoods by the roadside, where the Shell-bark Hickory, Chestnut, Black Walnut, Pecan and Butternut would thrive equally well, yielding in addition bushels of the richest nuts and increasing in productiveness for one, two or more centuries. Mr. Fuller himself states that when young he selected the popular shade-trees, all of which flourished, and when they were twenty years old they began to be admired for their beauty, although their roots robbed the soil of the adjacent fields considerably. When his trees had become thirty years old the best of them were probably worth \$2.00 apiece for firewood, or \$1.00 more than the nurseryman's price at the time of planting. If he had set nut-trees forty feet apart he would have had 130 trees in every single row a mile long, or twice as many, counting both sides of the road. With a hardy strain of Persian Walnuts, with Hickory-nuts as good as those borne by Hale's variety, or with American or foreign Chestnuts grafted to good varieties it would be safe to count on a hundred bushels for a double row of trees a mile long at twenty years from planting, and this would mean a considerable present income, with the promise of an increasing supply for a hundred years. There are some disadvantages in the use of nut-trees for planting in the street, it is true, and yet we are inclined to think that Mr. Fuller's argument is fundamentally sound, especially as there is a steady increase in the demand for good nuts, and the best American nuts have increased largely in value during the last three or four decades.

The book is illustrated with helpful cuts, and having been issued so soon after the publication of the monograph on the same subject by the Agricultural Department at Washington this long-neglected subject ought now to begin to attract that attention which its importance demands.

Notes.

Perhaps the showiest of the Milkweeds about here is *Asclepias tuberosa*, which is now conspicuous with its deep orange flowers, but some of the other species, like *A. rubra*, are also worth a place in the hardy plant border.

Spiræa Anthony Waterer, like all varieties of this type, has a disagreeable dead-and-alive look if the flowers are allowed to wither and go to seed. The proper way to treat this shrub is

to cut off each flower-cluster as soon as it has begun to fade, and then the plant will continue to show its rosy pink bloom until autumn.

One of the largest Oak-trees in this country, says *Meehans' Monthly* for July, is a Red Oak in a forest of Pemiscot County, Missouri. The straight trunk of this tree, recently measured by Colonel George B. Bowles, of Affton, St. Louis County, has a circumference of twenty-seven feet near the ground and nineteen feet eight feet above, and is clear for sixty feet to the first limb.

The receipts of new southern potatoes at this season have been smaller in this city than the average for the past five years, and yet the prices have been lower than they ever were, partly because there were so many old potatoes on hand when the season began, and partly because there has been a light call for them in that part of the country which receives its supplies from this market. Good sound potatoes sell for sixty cents a barrel, fair ones bring no more than fifty cents, and poor ones even less, which means that the season has been a disastrous one to the southern potato grower.

Although *Coreopsis grandiflora* and *C. lanceolata* are native plants, they were rarely seen in gardens until a few years ago. They are beautiful in a wild state, but they grow much more vigorously when well cared for. A mass of either of these plants will beautify any garden by the wonderful profusion of their long-stemmed clear yellow flowers. They are so easily produced that no garden should be without them. Another indispensable plant is the old-fashioned *Lychnis Chalcidonica*, which was once more common than it now is in country gardens. Its flat clusters of flowers of the most vivid scarlet make a conspicuous feature at this season in the hardy herbaceous border.

The authorities at Kew experienced considerable difficulty at first in making *Lilium giganteum* at home there, but it finally has found exactly the conditions it likes in the Bamboo garden, where it seems to be permanently established and naturalized. Not only do the soil and situation suit the plant, but nothing could be more effective in appearance than the tall and stately spikes of great white flowers amid the feathery masses of the Bamboo. It ought to be added that, besides these Lilies, there are enough other flowering plants here to emphasize by their contrast the beauty of the noble Grasses, so that the Bamboo garden is really one of the most attractive spots in the gardens at Kew.

According to *The Country Gentleman*, Mr. Schuyler Worden is still living in the village of Minetto, Oswego County, New York, at the age of nearly ninety years. It is more than thirty-five years ago since he planted a quantity of seeds of the Concord Grape, and it was the most vigorous of these seedlings which is the parent of the widely distributed variety known as the Worden. It was not placed in the hands of nurserymen for introduction, and for many years it was spoken of slightly and said to be nothing more than the ordinary Concord, and thousands of Concord vines were sold as genuine Wordens. In recent years, however, the Worden has taken its true position as one of the very best of black grapes. The original vine is said to be still growing where it was first planted.

The first horticultural school for women in Germany was opened at Friedenau, near Berlin, in the autumn of 1894, and it will graduate its first class of seven members next fall. One of the graduates will then assume the position of teacher in a similar school recently established at Riga, in Livonia. On the first of October next still another institution of the kind will be opened on the estate of Baroness Barth-Harmating, near Plauen, in Saxony. The courses of study extend over two or three years, and include not only the various branches of horticulture, but also fundamental scientific instruction and such knowledge of business methods as is needed for the successful prosecution of commercial gardening. Emphasis is laid upon the fact that the new work thus made possible for women is suitable for those of the cultivated classes, and not for uneducated or semi-educated rustics.

At the midsummer meeting of the Minnesota State Horticultural Society much time was given to the discussion of plans for forest development and protection, and the proposition of Captain Cross, of which we have already made mention, to make the state a trustee of the cut-over Pine-lands, was endorsed and a resolution in favor of an enactment by the next Legislature to this effect was adopted. It was also resolved that encouragement be given to the project of setting apart a small area of well-timbered state lands to be operated by the

University according to the best systems of forestry, for the purpose of illustrating the advantages of good forest management. In other words, according to Mr. H. B. Ayres, who introduced the resolution, an effort ought to be made to demonstrate that good forest management when applied to well-wooded lands is more profitable than the present method of lumbering.

In the earlier volumes of *GARDEN AND FOREST* we spoke of the value of the Japanese *Rosa multiflora* and published a portrait of it in vol. iii., page 405. Although it was described by Thunberg more than a hundred years ago it was only recently brought into cultivation, but within the last few years it has been disseminated extensively throughout this country from the Arnold Arboretum, where it was raised from seed sent by Herr Max Leichtlin as long ago as 1874. It is rather remarkable that this plant, like the Cherokee Rose, another native of eastern Asia, has been thoroughly naturalized in some parts of the southern states for a long time. Dr. Carl Mohr writes us from Mobile, Alabama, that it has been established in that section for three generations at least, where it grows quite as luxuriantly as the Cherokee Rose, and keeps its hold of the soil more firmly when it once gets possession. The southern plants seem identical with those raised in the Arboretum, except that the flowers vary from rose-color to almost pure white. A figure in the *Botanical Magazine* also represents the petals as pink or slightly shaded with pink, but the plants raised in the Arboretum all bore pure white flowers. So far as we know there is no record of the introduction of this plant into our southern states, and, perhaps, the time and manner of its arrival will remain a mystery as profound as that which shrouds the introduction of the Cherokee Rose.

The *Revue de l'Horticulture Belge* reports an interesting case at law which was tried before the Tribunal of Commerce at Bruges, in which Monsieur Vincke brought action against Messrs. Sander & Co. for one thousand francs, the price of a plant of *Cypripedium Harrisianum* in flower, which, when purchased, showed remarkable coloring. Next year, however, when the plant bloomed the flowers were of the ordinary character, and, therefore, the Messrs. Sander claimed that it was according to the custom of trade for the vender of a plant to guarantee the existence of special characteristics. Mr. Vincke held that there was no such guarantee, that the plant was bought in flower as it stood and that the Messrs. Sander took the risk of the variety being a permanent one. The court held that since the plant was offered without stipulation or without any guarantee that the color of the bloom was fixed, and that since there was no concealment or attempt to deceive, the conditions did not justify the annulment of the contract. Since hybrids and their offspring are specially prone to vary, and this is true of *Chrysanthemums*, *Roses* and other commercial flowers as well as of *Orchids*, buyers under this decision always take some risk. What the practice of the trade is in this country when new varieties are sold we are not able to state, but we never knew a novelty which was guaranteed by the seller to retain the special character which made it valuable.

Pears and plums made up most of the forty-six car-loads of fruit which arrived at this market from California last week, and the different colors of the plums and prunes now on the fruit-stands make them very attractive. The apricot yellow of *Prunus Simoni*, the light purple of Royal Hative, the salmon of the Peach, the yellow and purple of Kelsey's Japan with its rich bloom, the cherry-red of the Burbank, the darker red of the Satsuma under its thick bloom, the yellowish green of the Washington, the reddish purple of the Duane with its lilac bloom, the still deeper purple of the Tragedy, all these tints and many more make a feast for the eye, while in addition to their beauty the fragrance of this fruit, with that of the peaches and pears, apples and apricots which are still occasionally seen, makes another distinct attraction. These plums and prunes are bringing fair prices, but California peaches have now to come into competition with those from Georgia and meet with a slow sale. A few peaches are coming from Delaware and Maryland, but the best now, and these are fairly good, come from Georgia and South Carolina. Moore's Early, Delaware and Niagara grapes are coming from as far north as North Carolina, many of them immature and sour. Perhaps a well-ripened Niagara grape would taste well in midsummer, but somehow we associate their best flavor with cooler nights and they seem like an anachronism. Nyack Pippins, Sweet Bough and Astrachan apples, when hand-picked, are worth from \$1.50 to \$2.50 a barrel. Le Conte pears, from Florida, are worth \$3.00 a barrel, and Bartlett pears of full size and fair color, from California, sell for \$2.00 a box.

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Epping Forest.

FORESTS in English law, according to Blackstone, are "waste grounds belonging to the king, replenished with all manner of chase or venery, which are under the king's protection for the sake of his recreation and delight." Three hundred years ago Manwood wrote: "A forest is a certain territory of woody grounds and fruitful pastures privileged for wild beasts and fowles of forest, chase, and warren, to rest and abide in in the safe protection of the king and for his princely delight and pleasure." In this legal sense and in the colloquial language of former times in England, trees were only incidents, and not essentials, of a forest. Of course, forests were largely wood-clad, but the trees were considered of use chiefly as a game cover just as the pasturage was valued for the support of the game. In England at the present day, as in our own country and in other European countries, the terms "forests" and "forestry" are applied to stretches of woodland which produce fuel, timber and what are known as forest products, and a forest need not be a game preserve.

What is now known as Epping Forest is the remnant of a once extensive royal hunting-ground which embraced a large portion of the county of Essex. It was gradually reduced as portions of it were disafforested until, in 1640, it embraced some 60,000 acres, 12,000 being unenclosed wastes and woods, and the remainder to some extent cultivated, but subordinated to the hunting rights of the crown. As suburban land increased in value and the utilitarian spirit of the age began to consider it a crime to allow land to lie idle which might be cultivated, the boundaries were gradually contracted until in 1850 there were only 6,000 acres which were not fenced in, and during the next twenty years, under some injudicious legislation, half of this was enclosed and more or less built upon. About 1860 several persons of influence organized a Commons Preservation Society to resist encroachments upon open spaces belonging to the people, and began to take action in regard to the common land about London, and after a legal contest which lasted fifteen years the courts decided the case in favor of the Corporation of London, which had been fighting the battle for the society and the people, with

the final result that 5,542 acres were saved for the people to be theirs by inalienable right for recreation and enjoyment forever.

As it now exists, Epping Forest is a long and comparatively narrow stretch of rolling woodland and grassy spaces not enclosed, and in many places pastured on by the cattle of the commoners who still hold this right. The interesting fact in relation to this great pleasure-ground and the many small outlying spaces that belong to it is that within an hour's ride of the heart of the city of London this long stretch of wild woodland remains devoted to public use. The act which put the forest under the management of the Epping Forest Committee, which consists of twelve members of the Court of Common Council and four verderers resident within the forest and elected by the commoners, provides that "the Conservators shall at all times, as far as possible, preserve the natural aspect of the forest." This injunction accords entirely with a very strenuous public opinion which holds that the Forest shall "remain a forest and not be civilized into a park." To this end the Forest contains scarcely any roads except the regular county traffic roads which traverse it; there are no gravelled or asphalt paths, no trim borders, no exotic shrubs or trees. There is a Green Ride, which is a turf wood-road traversing the forest, and visitors can wander at will through the groves and thickets, but they will find no attempt to sophisticate the landscape. The natural underwood grows at will among the trees, the native sedges and grasses are left about the fringes of the little ponds, the shrubbery by the wayside consists of Wild Roses, Broom and indigenous bushes. Shy dark-brown fallow deer can be seen occasionally in the dense cover, and the beautiful little roe deer also makes its home in the thick woods, and generally the place is as untamed as nature can make it. To one driving along the main road the dense undergrowth on the forest border looks quite impenetrable, but, once within it, there is no difficulty in walking among the trees, although one can easily get lost in the woods almost within the sound of the roar of London. The visitor who canters over the Green Ride in company with some one who knows the forest thoroughly, especially if he has the good fortune to be guided by Mr. McKenzie, the Superintendent, who succeeded his father in the position and who knows every foot of it and all its varied beauties, can pass days of delight in exploring its many attractions. As the result of careful study, points have been selected on high ground, where by cutting away a few trees broad and refreshing views across the forest can be secured, and there are elevations which command smiling pastoral landscapes in Essex on the north and east and Hertford on the west, while from one point at least the dome of St. Paul's can be seen hanging against the southern sky, while the base of the cathedral and all the city lies hidden in the mist.

To Americans accustomed to the luxuriance and variety of our own forest growth the Epping woods are somewhat disappointing at first, because they are made up of so few species, and still more so because the trees over such large areas have been pollarded—that is, cut back, branch and stem, every fifteen years to seven feet from the ground to furnish fuel for the commoners. This mutilation of the trees has now been discontinued, of course, but when left to themselves these pollards become shock-headed specimens which have little beauty. Of course, there are many fairly good trees, although none of them match the venerable Oaks of Sherwood or the Beeches of Burnham. In High Beech, Monk Wood and some other parts of the forest, groves of good trees rise above the level of the others which have been unsparingly robbed of their tops for generations. In spite of its maltreatment, however, the great central mass of the forest, which lies in a single block some four miles long and covers four thousand acres, is a wild and beautiful wood of Oak, Beech, Hornbeam, Crab, Maple, Thorn, Birch and Holly, and one can find unalloyed pleasure in riding along its bridle-paths or wandering through its intricate by-ways. The names

Monk Wood and High Beech call to mind the fact that in this forest, as in every other part of England, there is hardly a hill or vale or even a thicket which has not a name which it has borne for generations. Wintry Wood, Epping Thicks, Broad Strood, Honey Lane, Long Running, Black Bushes, Fairmead Bottom, Round Thicket, Buttonseed Corner, The Hawk Wood, The Great Shrubbage, Rushy Plain and many more are picturesque reminders of some feature, or interesting as preserving some bit of local history. It is a pity that some of our own park-makers could not take a lesson from this habit and use the old names of the places which they have converted into pleasure-grounds when any such exist, instead of inventing some sentimental compound often from another language.

This adhesion to the old name in the forest is part of the conservative spirit which insists on letting everything alone, so that even when a tree falls the branches are cut away and the trunk is left to serve as a seat where the visitor may rest. And just here comes a problem which will grow more and more puzzling as time goes on. The people who insist that the forest must remain just as it is ought to know that these mutilated pollards are anything but natural, that they are permanently disfigured and will never make respectable upright trees. The managers of the forest are aware of this, and they know that the pollards stand too thickly for their own wholesome development, while the dense growth of their spindling branches will destroy the beautiful undergrowth which took possession of the ground when the lopping of the trees let in the light and air. They are aware that these clipped and artificial trees should be severely thinned out, and although some of the gnarled and twisted trunks should be left for their picturesque qualities, a vigorous use of the axe is the one thing which the forest most needs. And yet in England, as in America, whenever a tree is felled the people raise a clamor as if it were a desecration, when really this is only helping nature to reassert herself and encourage genuine woods to take the place of an unnatural growth. Young trees in abundance are coming up, and if an opportunity were only given to them the whole territory could be renovated in fifty years and be a thousand times more lovely than it would be if let alone.

And another problem will soon be pressing. Many parts of the forest are now thronged with visitors, but other parts are often so lonely that one can find in them almost the solitude of some of our primeval woods. As the giant city sweeps to the north and envelops the Forest the numbers of people who come to refresh themselves in its dark recesses will multiply. It will then be more difficult to preserve the charm of natural forest conditions. The undergrowth will be trampled to death; there will be need of drainage to make dry walks, and this will sap the life of some of the trees; the by-paths will be worn wider; the turf in the green roads will be ruined. Then will come the same problem which presents itself to the park-makers in our own country, where land is set apart for refreshing the bodies and the minds of invading multitudes—the problem how to provide for human convenience most completely and yet save as much of the poetic beauty of the wood as possible.

Plant Names of Indian Origin.—V.

TAMARACK (*Larix Americana*).—"The numerous descendants of the Dutch in New Jersey call it [*Larix*] Tamarack" (Michaux, *Amer. Sylva*). The name was in use in Pennsylvania also at an early period. If the word were Indian, as all dictionaries tell us, it would be Algonkin and belong to the Delaware dialect of that language. But no meaning can be extracted from it in its present form, and I have not been able to find any other. The Algonkin root *tam* means "to cut," and *ak*, as an inseparable suffix, designates a "standing tree," but the presence of the *r* renders the word meaningless. If we reject this letter, we have a word meaning "tree cutter," an eastern Algonkin name for the beaver.

Two explanations suggest themselves: (1) The word may be a corruption of *tacamahac*, another early name for the same tree, or (2), more probably, an alteration of *tamarick* (for *Tamarix*, the species *Gallica* of which is sometimes called "Cypress" in England), and which may have been fancifully applied to the American Larch by the early colonists from England, to which the European species is not indigenous. In a list of New York plants given in Macauley's *History of New York* (1829), the popular name "Larch" is accompanied with its proper scientific designation, but opposite the name "tamarac" is placed the genus name *Tamarix*, without any indication of species. It is evident that the compiler of the list regarded the word *tamarack* as a corruption of *tamarisk*, vulgo *tamarik* or *tamrik*. The Larch does not seem to have been put to any important economic use by our Indians, and there are, therefore, but few Algonkin names for it. None of those in my possession bears the least resemblance to the word under consideration. The name has been transferred to several western conifers.

TITI, or **TY TY** (*Cassandra calyculata*, var. *angustifolia*).—A name of the plant in one of the Indian languages of Florida. It probably belongs to a dialect of the *Timucua* family, now extinct, but which formerly occupied most of the peninsula. A root is sometimes, as in the word under consideration, reduplicated in Indian languages (especially in the Carib dialects, to which the *Timucua* is supposed to have been related) to indicate that the object specified by the name thus formed is of very common occurrence or exists in great abundance. Such is the case with the *Cassandra*, which, according to Williams (*Territory of Florida*, 1837), grows in crowded masses and constitutes the principal shrub of the Florida "galls" and swamps. The name has been applied also to *Cliftonia ligustrina*.

TOBACCO (*Nicotiana*).—From *tobaco*, the Taino (Haytian) name for a Y-shaped inhaler, the branches of which were inserted into the nostrils, while the stem was thrust into the smoke of the burning herb. The name of the plant (*N. Tabacum*) in the same language was *cohiba*.

TOMATO (*Lycopersicum esculentum*).—Formerly spelled *tomata*, from Aztec *tomatl*, through Mex.-Span. *tomate*. It is stated in Appleton's *Cyclopædia* that the name means "water-berry"; but this is an error. The word is from a radical *toma* (the meaning of which in this connection cannot now be ascertained), with the suffix *tl*, used in the Aztec language to form nouns. As far as we can judge from its applications, it seems to have been used simply as a name for "fruit" without restriction (as in the case of *tzapoll*, "sweet fruit," and *xocoll*, "sour fruit") as to character. Hernandez, in his chapter "De Tomatl" (*Thes. Rerum Medic. Mex.*, ed. Reccho, 1649, p. 295), describes several different kinds of *tomatl*, and, among them, the *xitomatl*, or "gourd tomato,"* which his editor identifies as the *Poma Amoris* (the *Lycopersicum esculentum* of modern botany). The word, with qualifying prefixes, was the name of the fruit of several different genera of plants—*Lycopersicum*, *Physalis*, *Solanum*, *Saracha*, *Phytolacca*, *Arbutus*, *Quercus*, etc.

TUCKAHOE (*Orantium aquaticum*).—"Out of the ground, the [Virginia] Indians dig earth-nuts, wild onions and a tuberous root they call Tuckahoe, which, while crude, is of a very hot and virulent quality; but they manage to make bread of it" (Beverly's *Hist. of Virginia*). This was probably *Peltandra alba*. Clayton's *Flora* assigns the name to the subterranean production called by Fries *Pachyma cocos*, sometimes styled Indian Loaf ("ad panem conficiendum Indi utuntur"—Clayton), and, by the Pamlico Algonkins, *okeepen*, "earth-root" (Harriot). The name was generic among the eastern Algonkins for round or roundish roots, and was also the name of an Indian "loaf," because of its shape, just as we say "roll" for bread so fashioned. The word is from *p'tukweoo*, "it is round," "it is shaped like a ball."

* So called from its resemblance, in shape, to a small Mexican cucurbit called *xicalli*.

TULE (*Scirpus lacustris*, *S. Tatora* and *Cyperus flavicans*).—Introduced through Spanish from Aztec *tulli* or *tolli*, a general name in that language for bulrushes.

WAHOO (1) (*Euonymus atropurpureus*).—From Dakota (Siouan) *wahoo* (the first vowel nasalized), meaning "arrow-wood." Spelled also Waahoo and Whahoo. (2) (*Ulmus alata*). From Muscogee (Choctaw-Muscogee) *úháhúá*, a word of unknown meaning.

WAMPAPIN (*Nelumbo lutea*).—From one of the western Algonkin dialects, probably Odjibway. It means "white root," and refers to the color of the inside of the farinaceous edible tubers.

WAMPEE.—A name of South Carolinian origin, assigned by Drayton (*View of S. Carol.*, 1802) and Shecut (*Flora Carolinænsis*, 1806) to *Arisæma triphyllum*; by Elliott (*Bot. S. Carol.*, 1817-24), Barton (*Flora Philad.*, 1818), Darby (*Bot. Southern States*) and others to *Pontederia cordata*, and by Rafinesque (*Med. Flora*, 1830) to *Peltandra alba*. Of the four languages formerly spoken in what is now the state of South Carolina, the name can be referred only to the Shawnee (Algonk.), in which the word would mean "it is white." In the case of *Arisæma* and *Peltandra*, this would refer to the color of the inside of the farinaceous root-stocks, which, after being boiled or roasted, in order to destroy their acidity, were eaten by the aborigines. As applied to the *Pontederia*, it would refer to the color of the farinaceous seeds, which likewise were used by the Indians as a food material.

WHIPSIWOG (*Erechthites hieracifolia*).—From Cree (Algonk.) *wippisiwok*, "they are hollow," like a tube.

WICKOPY (*Dirca palustris*).—An Algonkin word meaning "tying bark"; Abnaki, *wighebi*; Delaware, *wigebi*; Odjibway, *wigob*, etc. The tying-bark par excellence of the aborigines was the bast of the Linden, and it is that to which the above Algonkin names refer.

WICKUP, or **WICUP** (*Epilobium angustifolium*).—An alteration of the foregoing word; transferred from some species of *Osier* used as withes.

YAMP, or **YAMPAH** (*Carum Gairdneri*).—From the Snake or Shoshone (Shoshonean) name for the root, which is highly esteemed by these and other Indians as an article of food.

YAPON, **YAPOON**, **YAUPON**, or **YOPON** (*Ilex vomitoria*).—Probably a derivative from Catawba (Siouan) *yap*, or *yop*, "tree," "shrub," or from *yap'há*, "leaf" ("tree-hair"?). (The Muscogee name of the plant was *ássi lupútski*, "small leaves," usually abbreviated to *ássi*, "leaves," literally, "hairs" (of plant). The leaves, having been extensively used by the southern Indians for the preparation of an exhilarating beverage (called "black drink" by the early British traders), gave their name to the shrub itself as well as to the potion prepared from it.

New York.

W. R. Gerard.

Delights of a Rough Garden.

IN offering suggestions on gardening to the enthusiastic beginner it is usual to lay down at the outset a few unmistakable rules for his prudent guidance: Undertake no more than you can care for with thoroughness. Neatness is the first essential. Be content with small beginnings, and so on indefinitely.

The pleasures of the opposite plan, the rich satisfaction of a big, rough garden, in which beginnings and complete successes are somewhat loosely connected, and yet where freedom and beauty do live together in harmony, these attractive possibilities seldom find an advocate. On the strength of an experiment now in its fourth year I beg leave to put in a plea for the garden in which neatness is not a first essential. It seems quite possible to make a kind of treaty with Nature, in which she consents to do for a rough, yet much-loved garden filled with all sorts of tentative beginnings of loveliness, that which she does with so much charm for any old, abandoned garden left wholly to her possession. The lover of wild beauty, who loves

tamed and cultured beauty also, may find an opportunity for gardening upon this scale on any little country place of a few acres. With grass and trees, and, if possible, a varied surface to begin with—and these are everywhere in our eastern states the commonest conditions—there is abundant opportunity for the evolution of a beautiful garden.

The opportunity need not be restricted by the theory that every inch of ground broken must be kept under strict and exact cultivation. Roughly blocked out, with here and there an oasis of shrubbery established, a group of trees set, a screen of vines thrown up, a fence-line bordered with hardy perennials, the free garden on a bold scale may be the source of great enjoyment to the originator, even while its actual splendor is still the gift of the imagination.

Obviously the first step in making a garden which is to wander at will over one or many acres, must be a careful study of the best capabilities of the ground. A great number of rare, beautiful and costly plants, brought together at random, may represent, not beauty, but vulgar profusion, although they may be cared for with the greatest outlay of labor and the most exact precision; neither is mere mechanical order a thing of charm. With a good general plan, in which every feature is carefully considered and given its due place, every step accomplished helps the general effect. Variety in unity, multiplicity with harmony, these do not come as a matter of course or unsought where man has meddled. There must be a why for the place of every tree, every shrub, every winding path. If something quite different would do just as well there is proof positive of the lack of a well-thought-out plan.

Yet "I like it so" may be a sufficient reason. One of the great merits of this liberal scheme of gardening is the greater room it affords for the play of individual fancy. So many elements enter into the pleasure that we take in natural objects—association, with its subtle appeal, or that delight, not to be analyzed, which we receive from the sight of a special tint of color or quaintness of form, indifferent to one, to another a vivid joy; or the coveted pride may be the culminating glory of a definite period, as Lilac time or Rhododendron days—these are the delicate influences that may help to shape our own rough garden. At the bottom there is the delight of making it one's own. For man's delight in expressing himself is one of the deepest and most obstinate of human instincts. To make a little paradise of a bit of earth that bears upon its bosom the fruits, the flowers, the greenery that we love best, a bit of common soil expressive of our loves and likings, our individual tastes and aversions, this is one of the unfathomable joys of life. This is worth years of spring-time and long wintry sleep; years of wooing and winning, of coyness and final fruition.

One of the delights of a rough garden is its continual surprises. With the habit of tucking in seeds, cuttings, roots and bulbs, as occasion serves, planting and sowing without formality, there is something very delightful in the apparent spontaneity with which unlooked-for bloom and beauty often come to light. Broad mixed borders in which hardy plants are irregularly grouped (not without a constant study of the advantages of contrast and relief) make this the simplest matter possible. The Iris or the Lily bulb is buried, the seed is sown and the ground occupied staked to prevent accidents; suddenly, as it seems, a new shape of delicate beauty greets the eye. A big rough garden gives an encouraging opportunity to experiment. Tiny bulblets (as those found on the stems of Tiger Lilies) are gathered on a country ramble from the wayside garden of a dismantled house; they fill a vacant bit of space, and soon a great clump of solid green lifts its flame-like spires, to last in their place how long? A hundred years it may be, so some one has said. At midsummer you find a hedge of Hollyhocks in bloom. You gather a handful of seed as they ripen, and give them room in a remote corner. The green rosettes of the young plants cling to the ground, almost unnoticed and unremembered, but another year and who can ignore that marshaled magnificence? Not an-

nuals and biennials merely, but shrubs and trees also increase and multiply with extraordinary ease in the rough garden, where the discipline is not too severe. Fruit and flower, shade and fragrance, homely use and stately adornment mingle happily here in the garden held in partnership with Nature.

Fruit-trees, hardy shrubs, climbers and flowering perennials, the chief elements required for the formation of a garden of this type, are now supplied in unprecedented variety and at trifling cost. It is surprising that more summer residents in the country do not taste for themselves the full flavor of this inexhaustible recreation and delight of making all sorts of exquisite and delightful things grow where not one grew before.

Amherst, Mass.

D. H. R. Goodale.

Plant Notes.

Viburnum cassinoides.

THE value of the eastern American *Viburnums* as garden plants has been pointed out over and over again in these columns. With larger acquaintance and better opportunities for watching them in cultivation, our admiration for this group of plants increases, however, and we offer no excuse for recurring to it again. Nearly all the species are good garden plants, the only exceptions being the Hobble-bush, *Viburnum lantanoides*, the most beautiful, perhaps, of the entire group, but an exceedingly difficult plant to manage in cultivation, and *Viburnum pauciflorum*, a diminutive boreal and alpine representative of the *Opulus* section of the genus. The flowers of this slender shrub are not particularly showy, and in the Arnold Arboretum, at least, where a great deal of attention has been given to the cultivation of these plants, it has never flourished. It is certainly needless to speak here of the Cranberry-tree, *Viburnum Opulus*. Every one knows this tall shrub either in its natural state, with flat cymes surrounded with large white ray-flowers, or in its sterile form, in which all the flowers are neutral and it is the garden Snowball. This shrub grows all through the northern temperate zone, and the best form in cultivation is one which came originally from northern China, and was first raised in the Arnold Arboretum.

Viburnum pubescens and *Viburnum acerifolium* are both low shrubs of good habit with abundant white flowers and brilliant autumnal foliage. *Viburnum dentatum* and *Viburnum molle* are large shrubs with glossy, sharply cut leaves, ample clusters of white flowers and beautiful bright blue fruit. The former flowers at least two weeks earlier than the latter, which, although of more southern range, is equally hardy and equally desirable as a garden plant.

Our two tree *Viburnums*, *Viburnum Lentago* and *Viburnum prunifolium*, the first of more northern range, are well suited to decorate American parks, where they can be used with great effect on the borders of wood roads or the margins of woods in company with native Thorns, the Flowering Dogwood, the Red-bud and several other small trees for which the silva of eastern North America is specially distinguished. These two *Viburnums* are plants which last a long time and continue to improve for many years. In good soil they often grow twenty feet tall and make heads at least twenty feet through. Like all the plants of this group, they are distinguished in appearance, and it is a pleasure to see them at every season of the year.

But the best garden plant among our *Viburnums* is *Viburnum cassinoides*, of which a figure appears on page 305 of this issue. It is a common inhabitant of northern swamps, and is distributed from Newfoundland to the Saskatchewan and southward to New Jersey. In its native swamps this *Viburnum* is a straggling shrub sometimes twelve feet in height, but in cultivation it makes a very compact symmetrical bush five or six feet tall and broad. The leaves are thick, leathery and rather dull green, and the flowers, which are pale straw-color, or nearly white,

are produced in compact, pedunculate, flat, five-rayed cymes four or five inches in diameter. They are succeeded by abundant fruit, which is pale green at first, then bright rose-color, and finally dark blue-black, berries of the three colors often appearing together in the same cluster.

Viburnum cassinoides has been used in great quantities to decorate the margins of the roads through the Arnold Arboretum, and seedling plants show a decided tendency to vary both in the size and form of the leaves, in the size of the flower-clusters, which are flat or rounded above, and in the color of the flowers. This tendency indicates that if large numbers of plants are raised from seeds individual plants may surpass in some particular of foliage, habit or flower any of the plants of the normal type, and a desirable variety may be established. Although it has been said many times before in this journal, we cannot refrain from saying again that among the hardy shrubs of all countries there are very few which surpass *Viburnum cassinoides* in beauty and in all those qualities which make a shrub desirable.

CASTANEA DENTATA.—The American Chestnut is one of the small number of our forest-trees of the first size which is conspicuous for its flowers, and since it blossoms in mid-summer when it has no rivals in this respect it attracts still more attention. These flowers, which appear in tassellike masses, are made up of aments from six to eight inches long, the green stems covered for the whole length with crowded flower clusters. Their cream-colored blossoms show to the best advantage among the dark green leaves, and in early July Chestnut-trees in flower, whether standing by themselves or in the forest, are striking objects in the landscape. But the Chestnut is beautiful at every season, and a full-grown tree, with its broad, dome-like head and massive trunk, appears as sturdy as any Oak. The foliage is rich glossy green, and it is rarely injured by fungous diseases or insects. No tree grows so rapidly on the dry gravelly hillsides of the north-eastern states, and for various purposes it is one of our most useful timber-trees. It has the peculiar merit, too, of throwing up shoots from the trunk which become large enough for fence-posts or railway-ties in a few years, so that a Chestnut forest can be cut over every thirty or forty years, and continue productive for generations. The abundant nuts of this tree are much better in flavor than those of the Japanese or European trees, and there is little doubt that by proper selection a strain of nuts of large size could be produced, and when the population of this country increases so as to make it necessary to husband our home food supply, our own Chestnut-tree may become as important for the production of nuts as its near relatives in southern Europe.

HEMEROCALLIS AURANTIACA MAJOR.—A year ago it was stated in one of Mr. Watson's letters to this journal that a first-class certificate had been given to this handsome Day Lily by the Royal Horticultural Society. In the last number of *The Garden* received here there is a good picture from a photograph of a plant in flower. We have never seen this plant flowering in this country, but as it appeared in the Botanical Garden at Oxford a few weeks ago it was worthy of all the commendation which has been bestowed upon it. In form and habit it seems to resemble *Hemerocallis fulva*, so common in old-fashioned gardens, but the flowers are much larger, fully six inches across, and of a uniform deep yellow. It has especial value since it flowers after *H. flava*, which we have often commended as one of the best of garden plants, with its fragrant lemon-yellow flowers on long naked stems. A large vase filled with the long-stemmed flowers of either of these Day Lilies is a very imposing object. *H. Dumortieri* is another good plant, although its deep orange-yellow flowers are borne on shorter stems and they have no fragrance. It is admirable, however, for massing on shrub borders like the old *H. fulva*, or Mahogany Lily, as it is sometimes called. *H. Thunbergii* is another garden species which ought to be better known, for it is quite as easy to grow as any of the

rest. Its flowers are borne on long stems and they are a clear yellow, of a lighter tint even than those of *H. flava*. It has the merit of being later than any of those mentioned, and is at its best here in the latter half of July.

Cultural Department.

The Hardy Plant Border.

A MASS of the common Prickly Pear, *Opuntia vulgaris*, has been one of the most attractive features of the hardy plant border for the past month. The flowers are two inches

them in winter, though I believe they are perfectly hardy without. The plants are easily propagated from seed or by breaking up the stems in early spring.

Callirrhoe involucrata, a prostrate malvaceous plant, is just now one of the best things in flower in that family. The beautiful crimson flowers are two inches in diameter, and are fine for cutting, the flower-stalks being from eight to twelve inches long. It blooms continuously from July until October. It is a perennial and delights in a good rich soil and an open position. *Sida indica*, another malvaceous plant, is in flower here for the first time. The stems are eighteen inches high and much branched. The leaves are cordate, three inches long by two wide. The flowers are carried singly on short petioles



Fig. 47.—*Viburnum cassinoides*.—See page 304.

in diameter, and of a bright yellow color and produced in great numbers, each of the flattened stems bearing from three to seven flowers. *O. Rafinesqii* has also flowered well. The flowers of this species are rather larger and have more substance than those of *O. vulgaris*. *O. oplocarpa* is a larger-growing species than either of the preceding; the flattened stems are more rhomboidal in outline, and of a bluish green color. *Opuntias* should be massed to be seen at their best. They are not particular as to soil, but they require an open sunny position. We usually throw a little light covering over

from the axils of the leaves; they are about one and a half inches in diameter and of a pale buff, a color unusual among flowers. The whole plant is covered with soft downy hairs. *Commelinas* deserve to become more popular than they are at present. A bed of *C. cœlestis*, a Mexican species, is just now in full bloom. The plants are of bushy habit, one foot high, with sheathing oblanceolate leaves three to six inches long by two broad. The flowers are in clusters and produced on stalks two to four inches long. The color is of the brightest blue; they close, however, about noon, but they are particularly

beautiful in early morning. They have thickened fleshy roots and must be lifted before winter and stored in sand, as *Dahlia roots* are, and they must not be allowed to get dry. *C. Hasskarlii*, an East Indian species, is more spreading and weedy in habit, though the flowers are of the same color as those of *C. coelestis*.

Last year we received a plant from Thomas Meehan, of Germantown, Philadelphia, under the name of *Betonica rosea*, and this is one of the best perennials we have. It belongs to the Labiate family and grows a foot and a half high. The leaves are opposite, oblanceolate in outline, four inches long by two wide, with crenated edges. The flowers are in close terminal whorls and of a lovely rosy pink color. This plant has often been mistaken for an Orchid. According to the *Index Kewensis*, the name of this plant is now changed to *Stachys grandiflora*. A mass of the well-known and useful *Stachys Betonica* is now in full bloom, and the purple spikes of flowers make a good display at this season. The variety *grandiflora* has much larger leaves and flowers than *S. Betonica*, but does not appear to flower as freely. They both do well in almost any position, but they like best a moist rich soil.

Trachymene coerulea, a west Australian umbelliferous annual, is now flowering in this garden. The stems are two feet in height and branched. The trifoliate leaves are sessile and about three inches long by two wide and deeply lobed. Both stem and leaves are thickly covered with soft hairs. The flowers are light blue in color and borne in a simple umbel from two to three inches in diameter. The flower-stalks are about eight inches in length. I consider this one of the best annuals we have. *Erysimum Perowskianum* is another good annual belonging to the Mustard family, and which deserves to become popular. The plant grows to about one foot in height and is of a bushy habit. The leaves are lanceolate, four to six inches long by half an inch wide, and sessile. The flowers are borne on erect racemes and are of a reddish orange color and sweet-scented. Both plant and flowers closely resemble some of the dwarf forms of the English Wallflower. It stands the sun well and flowers almost all summer. It is most useful for the front of the herbaceous border and for cutting purposes. It is a native of the Caucasus.

Catananche lutea, a composite annual, is of a low straggling habit, but is very showy and useful for cutting. The leaves are sessile, six to eight inches long by two wide, with toothed edges. The flowers are yellow, with a chocolate centre, and about two inches in diameter. *C. coerulea* is a perennial species, with blue flowers, from two to three feet high.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Some Good Annuals.

THE dwarf compact Swan River Daisy, *Brachycome iberidifolia*, makes a handsome bed at this time. It is only some eight inches high, and the many-branched stems are terminated by loose clusters of small, blue, *Cineraria*-like flowers. The flowers are produced abundantly, and a single flower measures one inch across. The white-flowered form of this plant is very desirable and makes a good companion for the one with blue flowers. To secure the best effect a number of plants should be massed together in a light sandy soil and an open sunny position, where they keep on blossoming for many weeks.

Another showy genus from Australia is *Rhodanthe*, now included in *Helipterum*, although for garden purposes it is distinct enough to be kept separate. *R. Manglesii* is a distinct plant, a foot in height, with erect, glabrous and corymbosely branched stems. The bright rose-colored flower-heads are produced on long peduncles. The flowers are "everlasting," and when dried are useful for winter bouquets. A light sandy soil and a sunny position also suits this plant well. It also has a white-flowered variety and a form with double flowers, both of which are desirable garden annuals.

Sanvitalia procumbens is a dwarf Mexican annual that was introduced from there in 1798. It is a slender, trailing plant about six inches in height, and its compact habit makes it useful for edging beds or planting in masses in small round beds, where it makes a conspicuous yellow mass of color. The flower-heads are small, but they are produced in great numbers. The form with double flowers is very desirable and grows with as much ease as the typical plant.

Monolopia major is an annual composite plant from California that has showy terminal, solitary, sulphur-yellow flower-heads about an inch in diameter. The plants grown here are about fifteen inches high, and they have narrow entire leaves and are attractive now with their distinct flowers. This plant

grows freely in any ordinary garden soil, but prefers a sunny situation.

The genus *Phacelia* contains many showy garden annuals which are easy to grow. *P. viscida* is a showy species with branched stems, a foot in height and broadly ovate, subcordate leaves. The blue flowers are of a good size and borne on racemes. *P. tenacetifolia* makes a handsome bed of blue. It grows about eighteen inches high, and the flowers are carried in dense spike-like racemes. *P. divaricata* is a desirable plant; so is *P. Parryi*, a dwarf species about six inches high, with fine large flowers of a dark violet-blue. All these species flower plentifully and the plants are very attractive for some length of time.

A small bed of *Lychnis coeli-rosea* in the garden has been very bright for several weeks, and is much admired. The plants are about fifteen inches high and are just now all ablaze with bright rosy purple flowers. This *Lychnis* is well adapted for growing in masses, and in this way it is most effective. It was introduced from the Levant one hundred and eighty years ago, but is now rarely seen in gardens here.

The annual Bellflowers when well grown make neat plants, and they produce a good supply of showy flowers. Perhaps the most singular plant in the genus *Campanula* is *C. macrostyla*. The height of the plants grown here is about fifteen inches and the stems and leaves are bristly. The lower leaves are ovate-oblong and acute, while those on the upper part of the stems are ovate-lanceolate, hispid on both sides and ciliated with bristles. The flowers are large and borne singly on stout hairy stalks, and their color is dull purple, reticulated with violet. The length of the stigma is the most remarkable part of the flower, and the large calyx is interesting. This showy Bellflower is a native of Asia Minor. The seeds from which our plants were raised were received from Mr. J. N. Gerard, Elizabeth, New Jersey, who said they came from Asia Minor. We have grown this plant many times before, but the plants now in bloom have larger flowers than the ones we once grew. The plant ought to have a place in every garden of any pretensions. Another good annual Bellflower is *C. Loreyi*, a plant that comes from the south of Europe. It makes nice, compact, bushy plants about nine inches in height, with stalkless shining leaves. The flowers are produced in quantity, so that the plant is quite decorative when its blue-violet flowers are in good condition. The white-flowered form of this plant is common and makes a neat and distinct plant. A position near the front of a sunny border, in light and fairly rich soil, is best suited to their wants.

The genus *Clarkia* has a few showy species and varieties which are common and useful garden annuals. These native annuals are very effective, robust in growth and showing a profusion of showy flowers for a long time during the summer. *Clarkia elegans* is a much-branched plant, having long leafy racemes. It is about two feet high and has lanceolate-dentate leaves; the petals entire, broader than long, and are of a lilac-purple color. There are quite a number of desirable varieties of this plant; some of them have white flowers, others rose, and the double-flowered kinds are good. *C. pulchella* is another species with a good habit, and it is also very floriferous. The height of this plant is about eighteen inches, and its stems are clothed with linear leaves. The pretty flowers are of a purple color and plentifully produced. The varieties of this species make desirable plants. *Clarkias* grow freely in rich light sandy soil and a sunny position, and as their flowering season lasts for some time they are well adapted for planting in small beds. They should be planted six or eight inches apart each way as they grow fast and do not make such stocky plants unless they have plenty of room to show their character and develop themselves properly.

Emilia sagittata is a pretty composite nearly related to the *Senecios*. Its bright orange-scarlet flower-heads are produced very plentifully on long slender stems and they measure about one inch across. A small piece of ground planted with this *Emilia* makes a good mass of a bright taking color just now. In a light sandy soil and a sunny position it will produce a wealth of flowers for two or three months.

Crepis rubra, or sometimes found under the name *Barkhansia*, is a serviceable annual about a foot high, and it has large showy flower-heads. This plant is the best species belonging to the large genus. *Crepis* has one hundred and thirty species, but most of them are weedy and inferior as garden plants. The red flower-heads are borne singly on long stems, and they measure over two inches across. The white-flowered variety is also desirable. All these annuals are raised from seed sown about the beginning of April in pots, or boxes if a large number of plants are needed, in a moderately warm greenhouse. When the seedlings are large enough to handle

they are pricked into boxes or pots of fine soil. In a week or two they are large enough to put into small pots and then removed to a frame where they are kept until the weather is warm enough to plant them in the garden. Some will think that it is unnecessary work to put the seedlings into small pots, but experience has taught me that it is by far the best way to grow them. When planting time comes they are rooted in a nice solid ball of earth and never stop growing when put in the ground.

Harvard University Botanic Garden.

Robert Cameron.

The Propagation of Tender Plants.

MIDSUMMER is a good time for the propagation of various warm-house plants, for, while some care is required to avoid the damping off of cuttings of tender plants, many will root rapidly now and become well established before winter. Among these are such admirable kinds as *Cyanophyllum*, *Sphærogyne*, *Medinella*, *Rudgea microcephala* and the *Nepenthes*. They will all root more readily in single-eye cuttings, unless short, stocky side-shoots of firm young growth can be secured, the latter forming useful plants more quickly than the single eyes. The cuttings should be firmly planted in small pots singly, and, as a rule, they will form roots more quickly in cocoa-fibre than in soil. They should be kept rather close during the daytime in a propagating-frame or under a bell-glass, and have more air at night to prevent any undue accumulation of moisture.

The *Nepenthes* will, I think, make more stocky and short-jointed plants from side-shoot cuttings than from eyes, and plants of this description produce better pitchers. The *Aralias* can also be propagated to advantage now; some root quite readily, while others require grafting. *A. leptophylla*, *A. Guilfoylei*, *A. reticulata*, *A. filcifolia* and *A. Chabrierii* usually root in a reasonably short time, but the beautiful *A. Veitchii* and *A. Veitchii gracillima* root rather slowly under this treatment, and can be increased more rapidly and surely by grafting on *A. reticulata* or *A. Guilfoylei*. If kept rather close and well shaded in a propagating-frame the scions will soon unite with the stock and will grow away freely in a warm house after removal from the frame. These two (*A. Veitchii* and its form) are well worth the extra trouble, both being highly decorative in the greenhouse and also valuable for vases and veranda-boxes during the summer.

The *Dieffenbachias* also, of which there now is quite an extensive list, can be propagated at this season quite easily, cuttings with foliage being not absolutely necessary for this purpose. A specimen that has become leggy and unsightly from the loss of its lower leaves will furnish good material for the propagating-bench. The stem should be cut into pieces of a single joint; the cut surfaces should be dipped into slaked lime to prevent decay, and planted in sand. In most cases they will send out roots and start into growth in a few weeks. *Poinsettia* cuttings may also be taken now in order to furnish the dwarf specimens in five or six inch pots, useful for winter decorations. These cuttings must be watched closely to prevent wilting of the foliage and also overwatering.

The *Bertolonias* and *Sonerilas* form pretty little specimens when several young plants are placed in an eight or ten inch pan in light rich soil, and the plants for this purpose can be rooted in a very short period during the warm weather. One point to be remembered in their cultivation is pinching off the flower-buds as they appear, to insure large leaves and strong growth.

Dichorisandras are but little grown, though at least two of them are worthy of a place in a collection of stove-plants. *D. musaica* and *D. undata* are both interesting and pretty, and form handsome specimens when several young plants are grouped in a pan.

The various *Begonias* required for foliage and for flowers during the coming winter will also require potting on before they become stunted, and a basket of well-grown *B. glaucophylla scandens* is an attraction for the conservatory.

Holmesburg, Pa.

W. H. Taplin.

Chrysanthemums.

CHRYSANTHEMUMS intended for specimen plants should now be gotten into shape. Up to this time it has been the object to develop as many growing shoots as possible. Except for a few runaway shoots, no more stopping will be required. If stopping has been properly carried out the tying of plants into a neat bushy form will be comparatively easy. It is a good plan to keep this work well forward. It is a difficult matter to properly adjust the shoots of plants which are overgrown, especially when the season is advanced. Some injury

must necessarily result to the roots from severe staking, and the sooner the plants are well spread out, and as many stakes put into the ball of earth as it is expected to use, the better it will be. We always aim to complete this work some time during August so as to interfere as little as possible with root development later on. After staking out is finished the use of manure-water should be discontinued for a week, or until root action is again well established.

In growing fifty or more plants for a season there is some peculiarity about each variety which a careful cultivator will not fail to notice; whether it is in the soil or the manner of potting, or in the porosity of the pot or in natural conditions peculiar to the plant. Some varieties will take more water than others. It is of the utmost importance that this circumstance should be carefully noted. It would be an easy matter to overwater *Ivory* or *Cullingfordii* at any time, or *G. W. Childs* early in the season, though later it will take an abundance of water. *Louis Boehmer*, *Golden Hair*, *Minerva*, *Jos. H. White* or *W. H. Lincoln* might be watered ten times a day without injury. If these conditions are noted they should be kept in mind when using manure-water. Weak plants may be benefited by stimulants if they dry out freely, but if slowly it is better to use it sparingly. That weak plants need or will bear more than stronger plants is the reverse of true.

We have tried many kinds of stimulants with varied results. The safest are the best. Unless the exact strength of chemical fertilizers is known it is best to avoid them. Drainings from the barnyard contain nearly all the elements of a complete plant-food. If collected in a basin they should be well stirred before being used, as all the valuable ammoniacal salts lie at the bottom. They should be diluted to one-twentieth part to begin with, and made stronger as experience dictates. Sheep manure is excellent when used either as a top-dressing, half and half, with loam, or in a bag to leach out its strength in a tub of water. One pound to ten gallons of water makes the liquid about right for use. Sheep manure is highly charged with ammonia, and its action is quickly seen. If beneficial the foliage will be green and fresh-looking; if injurious it soon changes to yellowish green. When this misfortune happens it is due to the manure being too strong, and it must be discontinued at once. Root injury is the cause of the trouble, but by keeping the plants underwatered for a week or two they will generally recover. I have had this injury happen more than once. Some of the plants affected not later than the end of August have come out healthy, and they have been among the winning groups at the Boston show.

Many of the plants intended for specimen blooms will be showing the July bud. Except for a few varieties, it is best to discard it. If it appears on *Edwin Molyneux*, on plants which have been rooted in March, toward the end of the month of July and up to the 15th of August, it should be retained. This variety needs special management in this respect, and buds taken before or after the dates given nearly always produce blooms out of character.

The terms "crown" bud and "terminal" bud are confusing to many people, even to some growers. "First" bud and "last" bud would be more easily understood. The crown bud terminates the stem at one stage of its growth, the terminal bud is so named because it is the last bud formed. Shoots proceeding from below the first bud may bear terminals, or last buds. Often, however, on plants from cuttings rooted during May there will be a second or modified crown bud, below which true terminal, or last bud, shoots proceed. It is not an easy matter to define these buds with the terms we have. There are invariable structural characters, but a practiced eye only will note them. All crown, or first buds, are bracteate, and occur singly. All terminal, or last buds, are bractless, and occur in clusters of from three to ten buds.

Having discarded the first crown bud when it appears in July, we are left to take one of the other two. Either bud is good, and growers are guided by experience. The terminal, or last bud, is generally a few days later in maturing, but is better in color, though not so heavy in build. Where head-room is a consideration, the August bud is the better.

Wellesley, Mass.

T. D. Hatfield.

The Globe Artichoke.

THIS is one of the table luxuries that has rapidly come into use in recent years, and now in all gardens of any pretensions we see it cultivated for the succulent portion of the flower-head. The plant, *Cynara Scolymus*, is a perennial, and, indeed, were it not of culinary value, would be prized as a border plant of no mean pretension, owing to the huge thistle-like heads of showy blue flowers and elegantly cut luxuriant gray-green foliage.

Cynara Scolymus is but a cultivated form of *C. Cardunculus*, and is not known in a wild state. The latter is the Cardoon of gardens, and differs but little in appearance from its relative; it is cultivated, however, the same as Celery and cooked when the tender heart is blanched. It is seldom seen here, and is rarely used except by French cooks. In France great attention is paid to the cultivation of both these vegetables, and it is safe to say that nowhere else are such fine heads or such highly improved varieties to be seen. The Messrs. Vilmorin, of Paris, have done much toward bringing about this desirable result, and last summer they showed heads in London that created much comment in English journals. This improvement is largely the result of careful selection, together with good culture. "One plant, one flower" is a maxim there, and no doubt this is sound advice, as we have proved this season. The side shoots produce heads of inferior size and flavor, and they are rarely large enough to send to table, especially after larger ones have been used.

Another reason why we have missed perfection is in trusting wholly to seed for our plants, for it is possible to treat Artichokes as annuals, saving one good head for seed to raise another year under glass. These will all flower the first season if sown early in the year, and we have such plants now showing flowers. But the objection to this practice is that seedlings vary, and the tendency is too often to revert. The variation is quite marked in the individual plants. Sometimes a specially good form will make its appearance, and here is the opportunity for the cultivator to lift the plant in fall, winter it over in the greenhouse, and carefully divide it as often as offsets are produced, with portions of root attached. All these should be set out in favorable spring weather. It is not wise to trust to seed for reproduction of these plants.

Artichokes will thrive here in any soil that is naturally well drained in winter. They can be protected from the cold with success, but moisture is fatal when the plants are dormant, though they need a large amount in the growing season. We set the young plants at least three feet apart. It would be better to have the rows five feet from each other to prevent damage to the leaves when walking between the rows. The soil is made very rich to start with, and the surface covered in summer with a mulch of some non-conducting material, such as lawn clippings or straw from the stable. This answers another purpose in keeping down all weeds. We find that a top-dressing of salt also helps to keep down weeds, and is besides a good fertilizer for the plants. Many growers use seaweed for this purpose, as the Artichoke is of maritime origin.

In young plants of the first year it is well to cut off the flower-stem as soon as the head is cut; we find that the effort to flower is sometimes too much, and the plant dies without making any buds for its reproduction next year. Individual plants sometimes act as if they were annuals, and if these die out a gap is left in the beds. When cold weather sets in they must be protected for winter. We have tried various plans with greater or less success; if superfluous leaves are cut off and the plants tied up closely to the tops and the earth banked up to this height, or a few inches above, just before the arrival of frost, there is no danger of their dying from cold. To make sure to keep out moisture we nail two boards together and place these along the ridge of the bank to effectually throw off snow and water. In very severe sections it may be well to place leaves or straw about the banks of earth to help protect the plants. We have found it better not to do this until hard frosty weather has set in, so that the field mice that will most surely be attracted to this harbor will not be able to penetrate the earth and devour the hearts of the plants; they are very partial to these morsels, and seem to scent them from afar, but if the soil is well frozen on the outside the covering will tend to prevent its thawing, and the plants are safe from all danger. We have lifted the plants and put them in a cellar to winter over; also placed them in an unheated structure, but in each instance the results were unsatisfactory, owing to the loss from damping off of the crowns. Cold will arrest this in the open ground, and if they are uncovered in spring as soon as the weather favors the removal of the cover there will be very rapid growth and an abundance of fine flower-heads, provided the side-buds are picked off. It should be added that, when tying up the plants previous to covering them with earth, a stake should be placed to each one. This will materially assist in the operation and will be valuable in indicating where the crowns are when opening them up in spring. Otherwise some are sure to be injured. Before uncovering we put in a lot of rich manure in the trenches, and this is covered up with the earth as it is leveled.

It is not too much to predict that if more care is taken in the cultivation of this fine vegetable there will be a much greater

demand for it. Where it is necessary to produce a large quantity of vegetables for home use, of as much variety as possible, the Artichoke will be found a desirable change, and it is not, on the whole, difficult of cultivation if a few requirements are borne in mind.

South Lancaster, Mass.

E. O. Orpet.

Floating Plants.—Among the aquatic floating plants—that is, those which grow with their foliage lying on or above the water and their roots submerged—which are well adapted for growing in company with the more pretentious *Nymphæas* and *Nelumbiums*, are several which alter their appearance according to their surroundings to such an extent that they are sometimes taken for distinct species. The leaves of *Salvinias*, for example, when allowed to float on the surface of a large tank or pond, have a flattened-out appearance, and the plants are weak compared with specimens grown in the full sun in a confined space where the sun does not reach the root-like processes in the water. When grown in this way, the leaves—that is, the upper ones—are almost folded together, and very large, the plants crowding each other, in some cases two or three inches above the line of the water. In a confined space the spore capsules are produced most abundantly, while they are seldom seen on plants which float about in the open water. *Azolla pinnata* is another plant which behaves much in the same way. *Pistia stratiotes*, when the plants are crowded together so that the sun does not reach the roots, form very thick leaves and flower abundantly; but if the plants are grown singly in a tank so that the sun has access to the roots they soon turn sickly.

Clerodendron foetidum.—This plant, better known as *Clerodendron Bungei*, is one of the showiest among the many fine species of this genus. It is a native of China and has been in cultivation for a long period, unfortunately as a stove or greenhouse plant. It has been reported lately from a good source to be one of the finest hardy plants for the southern states. It is hardy in most winters, even as far north as Baltimore. The plant may be said to be herbaceous, as it throws up annual stems to a height of from three to four feet, each stem crowned with a very large corymb of bright pink flowers. When in full bloom a colony of plants in a suitable place in the garden makes an effective display. The leaves are large, heart-shaped and opposite to each other on the stems. As a greenhouse pot-plant it is not successful, since a plant in a six-inch pot does not have sufficient root room to throw up a fair-sized growth; moreover, when the plant is sickly it is a favorite one for mealy-bug and scale insects. Propagation may be effected either by cuttings of the young growths or by dividing the plants. If wanted in large quantities the thickest of the roots should be washed free from the soil, cut up into pieces about an inch in length and placed one inch deep in boxes of sand. They will sprout within two weeks if kept in a growing temperature.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Correspondence.

Edible Barberries.

To the Editor of GARDEN AND FOREST:

Sir,—I see that the nurserymen's catalogues enumerate several varieties of edible Barberries, some white, some red, some violet. Will you tell me which of the species bear the best fruit?

Asbury Park, N. J.

W.

[Most persons do not find Barberries very grateful to the taste, and they are generally neglected when other fruit can be had. However, when made into jams and jellies they are considered by many both wholesome and palatable, and the acid berries themselves without any preparation are relished by some persons. The fruit most used is that of the European *Berberis vulgaris*, and this varies very much on different plants in shade and size and flavor. By cultivation and selection varieties with black, purple, violet, yellow and white fruits are now offered for sale, and there is a so-called seedless variety. All of these are forms of the common European Barberry, and, perhaps, the fruit which most nearly approaches the normal red color may be generally regarded as the best for culinary purposes, as the pale or whitish fruits are often poorly developed. *B. vulgaris* has become so common and so thoroughly naturalized in our eastern states that it is often regarded as a native plant. No

doubt, by careful selection with a view to securing large and juicy fruits, better and more edible varieties than any we now have could be produced.

The Mahonia or Oregon Grape, *Berberis Aquifolium*, is well known for its dark evergreen Holly-like leaves, large clusters of bright yellow flowers, and large grape-like fruits covered with a dense blue bloom. This fruit is said to be much used and valued in some parts of the Pacific states. *B. buxifolia*, sometimes called *B. dulcis*, is a narrow-leaved evergreen species, a native of Chili and Patagonia. In Sweet's *Flower Garden* the fruit is said to be used in its native country, "both green and ripe, as we use gooseberries for making pies, tarts and preserves, for which it is most excellent. The berries are round, black, about the size of a Black Currant, and are produced in great abundance." This species is not very hardy in northern gardens.

Many of the other species of *Berberis*, of which there are a great number, produce juicy fruit which can be utilized. Among the least valuable from a domestic point of view is the fruit of the showy Japanese species, *B. Thunbergii*. This is not as juicy or pulpy as that of most other species, although it is more ornamental in winter after the fruits of others have dried and faded.—Ed.]

Privacy in Suburban Life.

To the Editor of GARDEN AND FOREST:

Sir.—In the June number of *The Cosmopolitan Magazine*, Mr. R. C. Sturgis, a well-known Boston architect, published an article pleading for more privacy in our homes and deploring the bare and forlorn appearance of our average suburban towns. This article has been noticed in GARDEN AND FOREST by two editorials, but, to my disappointment, although agreeing with Mr. Sturgis in deploring the present state of affairs, the remedy suggested by him of adopting the English methods of treating small places is declared to be unsuitable for our country.

If, however, we look in Europe for other examples, we seem to find none that so well suit our climate and mode of life. The chief difficulties that lie in the way of our adopting the methods as described by Mr. Sturgis apparently consist in the greater cost of labor with us and in the different character of our climate. To the first objection it may be answered that, although the price of labor is greater here, our suburban proprietor is receiving a salary correspondingly larger than that of his English cousin. As regards our climate, we hear a great deal of our scorching sun in summer and intense cold in winter, yet there is an abundant supply of trees, shrubs and flowers that thrive admirably with us; and, in fact, with the exception of evergreen shrubs, we are fully as well supplied with material for planting as they are in England; neither is the lack of moisture very severely felt in most small places, where the abundance and cheapness of our water-supplies allow a free use of the hose. The difficulty of growing flowers in our climate has always been greatly exaggerated; once the soil has been properly prepared they require but little care.

I cannot agree with the advice you give to place flowers in the front edges of the shrubberies; with but few exceptions they give poor results when robbed by the roots of shrubs. Such places can be better filled with spring bulbs of *Crocus*, *Narcissus*, etc., that will enliven the border in the early spring and whose decaying leaves will be covered later by the branches of the shrubs. A separate place should be reserved for flowers alone; it was formerly the custom to reserve the front yard for a flower garden, but a much better arrangement is to place it on one side, where it can be more easily screened from the highway as suggested by Mr. Sturgis. It can be connected with the house if desired, but in any case it should be screened on at least two sides by shrubs. Such a garden filled not with scarlet *Geraniums* and *Coleus*, but with our fine perennial flowers that come up year after year and require but little care, would be a constant source of delight to its owner.

The true reason for the bareness of our suburban towns is the result of an unfortunate fashion which claims that by removing all fences and boundaries a more park-like effect is produced. This fashion, although it has never received the sanction of our leading landscape-architects, has met with great success, and in this part of the country the fences have almost entirely disappeared, and with them, unfortunately, the gardens and shrubberies as well. The crusade which Mr. Sturgis is leading against this fashion seems worthy of the

assistance of GARDEN AND FOREST, and his suggestion for improvement ought not to be condemned unless some scheme that is definitely better is proposed. The vague allusion to a future American suburban garden, which is not described in detail, hardly meets the case.

Some solution of this problem of suburban homes would be of great interest to American architects, and if GARDEN AND FOREST were to give us a series of articles on the treatment of small suburban lots, they would, I think, be gladly copied in our architectural papers. Unfortunately, the architect is too often forced to do work that more properly belongs to the landscape-gardener, for, although for estates of more importance, the client will usually consent to the employment of a landscape-gardener, in the case of a lot of small size such a request from the architect is rarely accepted. The architect is then placed in a quandary and not unnaturally looks to a paper like GARDEN AND FOREST for assistance. After all, the main point in Mr. Sturgis's article is a plea for privacy; the question of more or less formality in the arrangement of our grounds will always be a matter of individual taste, depending largely on the style of the house and the general lay of the land, although our suburban lots being usually level, a formal arrangement would seem to be the simplest. The high walls of England covered with Moss and Ivy are undoubtedly out of place in our dry climate, but the same result of privacy can be attained during the summer months at least, when such privacy is most needed, by either belts of shrubs and trees or hedges. It is argued against the use of hedges that gaps may occur in them, but this will apply also to a row of trees or a garden-edging, and when properly planted such gaps occur but rarely. The labor of trimming a hedge is slight and requires little skill, and we have a large number of deciduous trees and shrubs admirably suited for such purposes. In spite of our much-abused climate we are unusually fortunate in a large choice of the so-called garden trees that are especially well adapted for small places, and a border of *Crabs*, *Thorns* and *Magnolias*, with smaller shrubs in the foreground, can give us as good effects as any produced in England, while serving as a screen from the highway as well.

Our houses, too, often stand bare when they should be covered with vines, and the foundation walls are unscreened when low shrubs should be planted against them to join the house to the ground. Few people realize how greatly a house is influenced by its surroundings; the old Colonial Homestead, stripped of its twin Elms and its enclosed garden gay with flowers, would lose the greater part of its charm.

In conclusion, allow me to ask the readers of GARDEN AND FOREST to study the interesting plans which Mr. Sturgis has published, and I believe they will find that their leading features can be profitably adopted in American gardens as well suited to our climate and our mode of life.

Boston.

Architect.

Recent Publications.

First Principles of Agriculture. By Edward B. Voorhees, A.M. Silver, Burdett & Co., Boston, Massachusetts.

This little book of two hundred pages does not consist of elementary treatises upon the various sciences which are the foundation of agricultural practice. It is simply meant to be an orderly presentation of such principles as are needed for the instruction of pupils in country district schools where the study of primary agriculture forms a part of the curriculum. Mr. Voorhees is the Professor of Agriculture in Rutgers College, and his experience has led him to believe that scientific agriculture can be taught in these schools in a sufficiently clear and simple way and to a sufficient extent to make what is learned there a safe guide in the ordinary operations of the farm and to constitute a proper foundation for future study. The scientific facts here stated seem to have been well selected for their purpose—that is, for example, what is said of the origin and formation of soils, of their composition and the means of improving them, are all up to a certain point subjects which can be treated within the comprehension of any bright boy or girl, and made most interesting. Whether this book will fulfill its purpose, however, depends to a large extent upon the teacher, who ought to have a much wider and profounder knowledge of chemistry, botany and biology than the elementary principles which are here enunciated. The facts are clearly stated, and in accord-

ance with the latest researches, so that the teachings of the book can be trusted as sound.

A thoroughly successful text-book on agriculture, for the use of public schools, is not an easy work to produce, for its author needs much more than a knowledge of the subject. The facts should be presented to young minds in such a way as to arrest attention and make their journey through these new fields attractive at every step. It would seem that pictures and an abundance of illustrative examples are features which could not be dispensed with. Abstract statements are dry to young people when concrete examples may be full of life. Mr. Voorhees is going over ground where comparatively few authors have trodden, and he has not many examples for his warning or profit. No doubt, experience will show where this book can be improved, and when one better adapted to its purpose appears it will probably differ from this one not so much in the range of subjects treated as it will in a more vivacious and pointed way of stating facts and greater care in leading up to them by natural and easy stages.

Notes.

The apple export trade has already begun, and on last Saturday a shipment of Summer Queens and Alexanders was made from this city to Liverpool.

Black Republican and Royal Ann cherries are still coming from Oregon, but there is little demand for this fruit now, when it is no longer at its best, and when eastern fruits are abundant and in large variety.

The pineapple season is now nearly closed, 2,500 barrels having arrived from Havana last week and about 400 barrels during the early part of this week. Small supplies of this fruit will continue to come from Florida during this month and August.

The sale of the first car-load shipments of California fruits to England this season occurred at Covent Garden, London, last Friday. In the absence of French fruit good prices were anticipated, but, although the California fruit was in sound condition, it was not of the requisite quality to command the highest prices. Not a few of the Bartlett pears in 3,800 half-boxes comprised in the shipment were small, and prices ranged from eighty-seven cents to \$2.62, while plums realized \$1.87 a crate. Prices in this city last week ranged from seventy-five cents to \$2.10 for Bartlett pears and from sixty-five cents to \$2.15 for plums.

The pomologist of the United States Department of Agriculture writes to *Meehans' Monthly* that the true name of the apple Rawles' Janet is Ralls' Genet. The apple was said to have been named for Monsieur Genet, the Minister of the French Government to this country during Washington's Administration. Monsieur Genet had apples of this kind sent from France for his own use, and Mr. Jefferson so admired them that he procured scions and gave them to Caleb Ralls, a nurseryman of Virginia, for propagation, who introduced the tree under the name of Genet. The apple has also been called the Jefferson Pippin, which authenticates in a measure the fact that Jefferson was connected with its introduction.

In Belgium, and in some other parts of Europe, the young shoots of the Hop-vine are cooked and served in the same way as asparagus. The shoots used for this purpose are blanched while passing through a mass of leaves or litter with which the stock is covered when they are to be used in this way. It is said that Hop-shoots have been used as a vegetable in England, although they have never been utilized as an article of commerce as they are in the Low Countries. There is nothing new about this, for, as a writer in *The Gardeners' Magazine* reminds us, Gerard speaks of the practice in his *Herball*, published three hundred years ago. We are not aware that hops have ever been used in this way in America, and we should hardly expect them to compete successfully with asparagus.

In reply to many inquiries addressed to the Cornell Experiment Station, Mr. E. G. Lodeman has collected as much as possible of the scattered experience of those who have grown dwarf Apples. The fact is, however, that these trees have been so sparingly and so carelessly grown that very little definite evidence of any value has been obtained. It is probably

true that apples on dwarf trees are handsomer and of a better quality than those grown on standards, so that the dwarf trees may, perhaps, be profitably used for growing varieties for fancy or dessert use. Such trees can be easily sprayed and the fruit can be easily thinned. Paradise stock is evidently the best to use, but Mr. Lodeman concludes that he cannot advise the planting of dwarf Apple-trees for any commercial reward. Experiments with these trees are worth making even for this purpose, and they certainly are for other purposes.

The so-called late blight has been very destructive to Potatoes for some years in many parts of New England, but Bulletin 38, issued by the Rhode Island Experiment Station, declares that it can be kept in control by the proper use of Bordeaux mixture. It does not seem to be necessary to treat the plants before the outbreak of the blight, whose presence can be recognized easily by the sudden blackening of large patches on the mature leaves and the peculiar odor given off by the decaying tissue. When the blight appears the plants must be promptly treated, however, and all their parts thoroughly covered with a film of the mixture in order to save them. The coating can be seen after the leaves have dried off, and if it is found imperfect the machinery and method should be inspected, changed if necessary, and the operation repeated until the job is well done. Spots of the liquid upon scattering leaves may do a little good, but spraying all the plants completely is the only assured safety.

In his report on the flora of Wyoming, Professor Aven Nelson remarks that the power to withstand frost which has been so remarkably developed in mountain floras is an unceasing cause of wonder, and the great beds of Phlox, Mertensia, Gilia, Actinella and other plants which he saw blooming freely when the night temperature fell to from five to twenty degrees below the freezing-point, suggested questions which are difficult to answer. Professor Nelson thinks that reduced atmospheric pressure plays an important part in preventing injury to plants, for the same species at lower altitudes would certainly perish in such cold. As an illustration of this he states that late in August, 1890, he noted a plot of Potatoes in full blossom at an elevation of some 9,000 feet. For three successive days he watched these plants, which then showed no trace of injury, although every night there were heavy frosts and ice formed in exposed water-pails. Such a degree of cold would, of course, have killed Potato plants, growing at the sea-level.

In Paris, where wood has been, to a large extent, substituted for asphalt and other paving material, southern pine is very largely used for blocks. These are laid on a concrete foundation, and, as is well known, the streets are less noisy and the pavement is considered more durable than any other. It would seem that if yellow pine pavement is the best for Paris, where public works are constructed with a view to the greatest economy, combined with utility, the same material could be used in America, especially in our southern cities. Experiments with wood pavement in New York and Chicago have been discouraging, but it may be that the fault was as much in the construction as in the material. In a climate where the ground freezes to the depth of three or four feet the foundation of the road would be unsettled to a degree unknown in London or Paris, and this upheaving may suffice alone to account not only for the stability of roadways, but of walls in England which endure for centuries, while they crumble and tumble here when only a few years old.

It is claimed by some persons that Cottons grown in India and Egypt are superior to the ordinary varieties grown in the south, and owing to the increasing importation of the staple into this country the experiment stations have been cultivating several varieties of Cotton from India and Egypt in order to compare their properties with our native forms. Of course, nothing definite can be determined about these plants until they have become acclimated by some years of careful cultivation. At Auburn, Alabama, experiments have been made in naturalizing these plants with the effort to secure the best results, so far as the health of the plant is concerned, that the soil and climate will permit, and cross-fertilization was then tried in order to unite the best properties of the foreign Cottons with those of the superior grades of American varieties to produce an exceptionally good plant. Last year several hundred crosses were made between American and foreign species, and from the seeds gathered the station has been quite successful in growing these cross-bred plants. Of course, it is too early to pronounce with definiteness the final results of these trials, but they will be watched with interest.

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The Teak Forests of Burma.

WE have more than once invited attention to the administration of the forests of India by the English Government as the best example of a forest policy carried out consistently and persistently over a large area. And while India differs widely from America in climate as well as in social and political conditions, the success achieved here in checking the reckless destruction of timber and restoring wasted forests to their normal vigor and productiveness, offers lessons of encouragement which Americans can study with profit. Indeed, the analogy between the condition of our own forests to-day and those of India forty years ago is so clear, and the forest abuses of the two countries so similar, that Mr. Ribentrop, the Inspector-General of Indian Forests, wrote out for us some of the salient features of the Indian forest policy for the instruction of Americans, and his statements we have already presented to the readers of this journal. The one capital result of the system of management inaugurated and carried out in India by Sir Dietrich Brandis is that these eastern forests are yielding an increasing revenue year by year—that is, they are not only paying expenses, but they are becoming more and more productive. It is almost discouraging to feel the need of repeating over and over again that this improvement of the forests is a fundamental purpose of all good forestry. Every one admits that it is bad husbandry to crop farm-lands with no regard to their productiveness in the years to come. But it is quite as wasteful and unscientific to treat a forest in this way as it is to exhaust agricultural lands.

It is because of the direct value as an object-lesson to us of the work of Sir Dietrich Brandis that we have asked him to give, with some detail, the history of his management of the Teak forests of Burma, and the introductory article of this series appears in this number. Any one who carefully follows this series and notes in how brief a time Sir Dietrich collected sufficient data to make a preliminary working plan, must be convinced that if our forests were put in charge of some one with a good knowledge of the principles of forest management and a good supply of executive force, there would be little difficulty in beginning at once to lay the foundations for a permanently success-

ful policy. Again: Persons who are well informed on this subject invariably assert that private enterprise cannot be trusted to conduct operations that ought to extend over an indefinite period of time. It is natural that a lumberman should conduct his work so as to get the maximum profit—that is, the greatest profit for himself—and not for the coming generation. The history of the forest operations in Burma establishes this conclusively. The story of the temporary abandonment of its original policy by the Government, of the destruction and loss which this change entailed, and of the return to a sound system, is a most instructive chapter in this history, and one which ought to furnish a conclusive reply to all those who believe that the management of forests can be entrusted to any power with a shorter life than that of a nation.

Another point for our instruction is the fact that officers of the army were found at the outset eminently fitted to help in building up a forest administration until the time when professionally trained foresters were available. This does not mean that military force was employed against timber thieves and herdsmen, but it means that we need not wait for a complete corps of specially skilled foresters before we lay the foundation of a thoroughly scientific forest administration. These young and active officers, in good health, trained to orderly habits and inured to work in the open air and exposure, can be trusted under good professional guidance to carry out the foundation work, and, perhaps, do as much as Colonel Pearson and Colonel Bailey did under Sir Dietrich Brandis, before skilled men like Schlich and Ribentrop were to be had. The experience in India also proves that in a dry hot climate forests can be protected from fire if we are willing to pay for such protection at first. If we do this the people themselves will soon learn that it is to their interest to be cautious with fire in the neighborhood of forests and they will be eager to help extinguish fires when accidentally kindled. Dispatches from the north-west during the past week have told that leagues upon leagues of magnificent timber have been burned. Of course, no increased yield in the future, and, in fact, no certain yield can ever be expected so long as such destruction is possible. Unless we have some far-sighted policy like that adopted for Burma with regard to forest fires we must abandon all hope of anything like practical forest management.

But it is not our intention to anticipate the lessons so clearly set forth in the valuable forest history which Sir Dietrich Brandis has furnished. There never was a time more appropriate for careful thought on questions of this kind than the present, when the Commission appointed by our National Academy of Science is studying the forests on the public domain for the purpose of recommending what part of the national forests shall pass into private control, how they can be administered so as to furnish the supplies needed for regions lying adjacent to them without decreasing their permanent value, and how a continuous, intelligent and honest management of these forests can best be secured. The points of practice which have been considered most essential in India are, according to Sir Dietrich: (1) An immediate collection of data as to the most useful kinds of timber, their rate of growth, and their requirements for the best development. (2) The sparing use of the timber, with the cutting carefully regulated, either by area or by volume. (3) Such a selection of trees to be cut as will best maintain the most valuable species. (4) Constant effort to increase the proportion of the more valuable kinds. (5) A forward-looking plan which secures a sustained and, if possible, a steadily increasing yield, even if this calls for the sacrifice of a boom at the outset. (6) The reservation of as large areas as possible for state forests, since it will be easier to give up land hereafter needed for cultivation or other purposes than it will be to acquire new forest-lands. It ought not to be impracticable to frame a system of forest management for this country which would contain all the essential features of the plan which has proved such a conspicuous success in India.

May we not hope that Congress can be induced to take such action as will make it possible to put a plan like this to the test of actual experiment, and that the people can be educated, not only to sustain the national legislature in enacting such laws, but to demand their passage and enforcement?

A Wild Garden.

NO form of gardening gives greater and more lasting pleasure than that which aims to naturalize wild or garden plants in positions where they will appear to be growing naturally and without the intervention of the gardener's art. As an illustration of what can be accomplished in this way we published some weeks ago a view in Mr. W. Bayard Cutting's garden at Oakdale, on Long Island, showing the effects obtained by planting the Japanese *Clematis paniculata* by the border of a pond embowered in native trees and shrubs, and on page 315 of this issue is a view of a wild garden at Auburn, New York, in which Mrs. Herbert Wadsworth has succeeded in naturalizing the common perennial Larkspur on the border of a small artificial pool fed by a natural spring. Although this garden was only three years old when Mrs. Wadsworth took the photograph which is reproduced in our illustration, the Larkspurs have taken a firm hold of the soil and have already spread more than twenty feet from the spot where the roots were first planted. The native Water-lily dots the surface of the pool, and its borders are gay with the flowers of the Marsh Marigold, the Blue Lungwort, and of many other native spring-flowering plants, and of Asters, Golden-rods and Sunflowers in their season; and from a miry bog hole covered with sedges and coarse grasses a charming little wild garden has been made. The original cost of such a garden, except in intelligence and taste, is small; it costs little to maintain, and with a little care in removing a few too vigorous-growing plants every year it will go on increasing indefinitely in naturalness and beauty.

Suburban Homes.

NO movement for the improvement of suburban homes which does not apply to the conditions prevailing in the average American suburb is likely to succeed. That is a defect of Mr. R. Clipston Sturgis's article, recently discussed in your columns, full as it is of valuable suggestions. Even if it applied to American conditions it would touch but a fraction of our suburban populations. It concerns a more distinctively rural life, like that of our quiet country towns. In our suburbs it would apply only to the homes of the wealthy or the very well-to-do.

Our suburbs are the overflow of great cities and comprise three or four distinct classes of population. First in numbers comes the artisan or laboring class, living there for the sake of cheaper rents or the possession of their own homes. Then comes another large class, consisting of clerks, bookkeepers and upper-grade employees in city establishments. They occupy humble but comfortable dwellings. A third class gives to the more attractive aspects of suburban life their peculiar tone, largely made up of city merchants or tradesmen, or men receiving salaries running between \$2,000 and \$5,000 a year. Greater cheapness of living, better air and more elbow-room are leading considerations with this class. Fourth may be reckoned the men of considerable wealth, whose tastes lead them to rural life and who possess the conspicuous country-seats to be found in nearly every suburban community. It is chiefly to the third class that efforts at improvement must be addressed. If successful here the force of example will be likely sooner or later to prevail with the others.

The average modern suburb is a depressing place. It gives little promise of the results which have been predicted for the much vaunted "suburban movement" as a relief from congestion and other ills of city life. It promises, instead, to distribute those ills over areas so extensive as to make remedial measures increasingly difficult. In place of clean pavements we have miles of ill-kept streets, muddy or dusty according to the weather. Endless rows of cheap wooden structures stand grimy with dust, and so absolutely stupid in their expressionless ugliness that it seems as if really intelligent people could

not exist in them. These suburbs are the children of cheap transit and real-estate speculation. The leading motive in their creation is the sale of the greatest number of square feet of land for the largest possible price a foot. Large communities are thus created overnight, as it were, entirely without the proper civic equipments of a modern town. Beautiful rural pastures are converted into human deserts. About New York and Boston, for example, there are municipalities of this character which have not so much as a square foot of public ground outside of the streets and the land occupied by school-buildings. As homes for children the urban slum districts of to-day, with their new and beautiful play-grounds and improved tenement construction, will soon be preferable to them. Even though in these districts the houses may be chiefly owned by their occupants, the development of a really homelike life, which must necessarily include beauty as a factor, cannot be looked for among them.

It is to the creation of new suburbs, therefore, that we must chiefly look for improvement. To this end there would doubtless have to be a radical departure in the size and shape of house-lots, the planning of houses, and, perhaps, to a considerable extent the laying out of streets. So great a change would make the reform one of great difficulty, although it might be too much to say that it is impracticable for that reason. The force of example has been so potent in other directions that it should not be too much to look for eventual success. If a sufficient number should once find the change desirable, the power of example would in time secure its general adoption.

What has already been accomplished in the way of suburban improvement indicates that more radical changes should be possible. The lines that have led to the present aspects of our better class suburbs are fundamentally wrong in certain respects, but, nevertheless, they have developed a great deal that is good. The removal of fences from street and boundary lines involved the overcoming of a conservatism that was rooted deep in our domestic traditions. Yet the aspect of openness, of spaciousness thus conferred, possessed a charm so great that the force of example was powerful enough to make it general in less than a generation, in spite of the manifest objections to this practice. Therefore, a return to the best that went with the loss of the old, while retaining also the best that was gained with the new, should be possible as soon as it can be shown how desirable it is.

One inestimable thing that has been gained by this transformation is the spirit of orderliness that characterizes our better class suburbs and rural towns. The openness of aspect that has been given to suburban grounds necessarily entails careful attention. The lawn-mower has, therefore, become almost as indispensable as the broom in the suburban household. This spirit has been carried so far as to produce a sense of bareness in the unrelieved carpets of turf that are altogether too common a feature. The vulgarity of the florid tapestry carpet, so much in favor within, has too commonly set the example for the ornamentation of the lawn carpet without, with horrid combinations of color and design in the way of bedding and foliage plants. But bad example and the lack of good example are chiefly responsible for these errors in taste, and there is evident in many quarters a gratifying tendency toward the judicious employment of shrubbery in the development of the house-grounds.

Efforts at reform should be directed both toward a consideration of what can be done under existing conditions and what should be done toward the establishment of new conditions. In addition to the desire for cheaper homes that carries multitudes to the suburbs, there are also the still more important motives of a desire for more agreeable and healthful conditions—purer air and sunshine, rural quiet and pleasanter surroundings in sight of grass, flowers, shrubs and trees. These gains are all too frequently but temporary. The tendency is toward their gradual effacement. The effort should be to make them permanent. So far as the more undesirable portions of our suburbs are concerned the sooner they are entirely urbanized the better. The movement toward urban amelioration, as witnessed in the improvement of congested districts, may be depended upon for their betterment. For the grade above this the outlook seems more hopeful. The cost of suburban house-lots will probably always remain so large as to make the extent of the average householder's possessions very limited. The problem is how to make the most of these conditions. What can be done with the present average lot? A frontage of fifty feet and a depth of one hundred feet is the standard size in many suburbs. A reduction in depth and a corresponding increase in width would be desirable. While this makes a lot of something less than an eighth of an acre, the average suburban lot contains consid-

erably less than a tenth of an acre. Comparatively few lots average a quarter of an acre, and within ten miles of a great city the possession of as much as half an acre for a homestead is usually a mark of affluence. Even the most modest of Mr. Sturgis's designs would exceed this limitation.

One may, to be sure, secure larger homestead areas by going farther from the city, where land is cheaper. With the remarkable development of quick transit facilities this recourse is becoming increasingly practicable. Such outer suburbs are usually accommodated by express trains, and in this way a place twenty or twenty-five miles from the city is practically as near as one from five to ten miles away. It may be said, however, that building-land in the remoter places is likewise thus given practically the same value as that nearer at hand. Theoretically this is true. But, fortunately, the supply of land is still immensely in excess of the demands for dwelling-places. With the widening of the circle that limits the suburban zone, as measured by the growth of transit facilities, the amount of land available for home-building purposes increases in geometrical ratio. It therefore becomes correspondingly difficult to monopolize such lands for the speculative real-estate enterprises that now curse the environs of every large city with their hideous huddlings of ramshackle wooden boxes. With so much land lying unoccupied on every hand it seems neither right nor reasonable that when thousands eagerly seek homes amid the more agreeable rural surroundings they should be squeezed into indecent proximity in neighborhoods that possess few of the advantages of either town or country. It seems likely that the more ideal suburban conditions will be established in these outer zones, at present chiefly occupied by woods and pastures. But it should be remembered that for the advantages of good streets, sewerage, water-supply, light, etc., a fairly compact population is required unless the cost to the individual is carried beyond the means of the average man. These necessities are what should really fix the value of building-land, and the size of house-lots should be made as large as may possibly be consistent with these conditions.

But meanwhile we must make the best of existing conditions. What is the best that can be done with lots of the present average size? The detached dwelling of the closely built suburb has few, if any, advantages over the house in the city block. There is air on all sides, to be sure, but the suburban house is apt to be deprived of needed sunshine by the close proximity of neighboring dwellings. As usually built upon, the land has little use for purposes of household recreation, and both outdoors and in, owing to surveillance from overlooking windows and from the street, there is less privacy than in the city dwelling.

With a lot of, say, 4,000 square feet the house occupies, as a rule, from 1,200 to 1,500 square feet. Some advantage might be gained by giving more careful consideration to the questions of air and sunlight in planning and placing the house. But the huddling system of detached dwellings is so radically defective that no great improvement can be looked for in this direction. A very material gain, however, might be made by adopting some plan of building in blocks or in semi-detached dwellings. Let us take an acre of land, for instance. With ten dwellings, this would give 4,356 square feet to each householder. With 1,500 square feet occupied by each house we would have 28,560 square feet left for outdoor space. If the ten dwellings were built in a block there would not only be a very considerable economy in construction, but, after deducting a reasonable space for yard-room, there would remain at least half an acre to be used in common for garden and playground purposes. An average block, bounded by four streets, would give a very much larger area for use in common.

An objection to this plan might come from the difficulty of securing unity of action among individual owners. For this reason it might work better for a tenant than a householding system, the rent including the cost of maintaining the open space. Under the initiative of some liberal building enterprise, however, the plan might be adapted to householding requirements. The maintenance of the open space held in common might, for instance, be vested in some trust, or, perhaps, public authority, the cost to be assessed annually upon the individual owners. Perhaps coöperation to this extent might lead to other forms of coöperation, as in a common laundry for the block, and possibly a coöperative kitchen.

The better class suburban street has a certain attractiveness in the well-kept lawn spaces in front of the houses, with usually a uniformity in the distance of the building-line from the street. As a rule, under any form of improvement over existing methods, it would probably be desirable to retain this space free and unobstructed, for the sake of the pleasing

appearance of breadth which it gives to the street. Then, however, let the rest of the ground be screened from the public eye at the house-line, either by shrubbery, lattice-work, wall, or balustrade, as may seem desirable. In combination with a judicious disposition of veranda and terrace space—taking care that the former does not exclude needed winter sunshine from the house—the better class suburban dwelling may thus be provided with charming opportunities for outdoor life with practically all the seclusion obtainable within. As for the requirements of those whose grounds range from half an acre upward, these should be carefully studied in each individual instance. In the development of the park-like suburban neighborhoods, which are increasingly in favor for the residences of the well-to-do, the services of a landscape-architect are usually demanded. In the development of the plan a provision for outdoor seclusion in connection with each home site needs thoughtful consideration with reference to the design as a whole.

Malden, Mass.

Sylvester Baxter.

Foreign Correspondence.

London Letter.

YUCCA ELATA.—A collection of Arizona species of *Yucca* was obtained for Kew about three years ago, and among them was a plant, with a five-foot stem, of *Y. elata*, which is now flowering in the temperate house. It has a scape eight feet long, bearing a branched panicle of flowers, which are milk-white, very fragrant, about three inches across when fully expanded, and are apparently of good lasting qualities. The plant is ornamental when not in flower, with its head of dark green linear leaves with white marginal fibres, and reflexed dark brown persistent dead leaves almost hiding the whole of the lower part of the stem. It is one of the handsomest of all the *Yuccas*, I believe. This is the first time this species has flowered in this country. It might be called an arborescent *Y. angustifolia* so far as leaf-characters go, but there is a wide difference between the two in inflorescence. The latter is hardy at Kew, where about fifty examples, almost full size, are a feature on a sunny slope in the Bamboo garden.—[See vol. ii., p. 569.—Ed.]

CLETHRA CANESCENS.—Flowering examples of this shrub were exhibited this week by Messrs. J. Veitch & Sons and were awarded a first-class certificate. The species is a native of Japan, Java, the Philippines, etc., and was introduced from the first-named country about twenty years ago by Messrs. Veitch, with whom it has proved hardy in their Coombe-Wood nursery. It formerly bore the name of *Clethra barbinervis*. It has stalked oval or obovate leaves three to five inches long, the margins serrate, the tip acuminate, the surface hairy and the nerve-pits bearded. The flowers are borne on erect slender racemes and they are pure white. In general appearance this species is most like the North American *C. alnifolia*, which is one of our most useful summer-flowering hardy shrubs. In the greenhouse one of the most attractive shrubs at this period of the year is *C. arborea*, a native of Madeira. It is a handsome evergreen at all times of the year, and when clothed with its elegant racemes or compound panicles of white Lily-of-the-valley-like flowers in July and August it is greatly admired.—[See vol. vi., p. 257.—Ed.]

ELLIOTIA RACEMOSA.—Collectors of rare hardy shrubs in this country are eagerly inquiring after this plant, of which there is a healthy example at Kew, probably the only one in Europe. Here, however, all attempts to propagate it have failed. I believe that some nurserymen in the United States possess this plant, possibly they have succeeded in working up a stock of it; if so we would much like to know how it is done. It is stated that this interesting monotypic genus is no longer to be found wild in the United States, the only locality where it used to be found having been swept by fire. The plant has never flowered in England. Perhaps some one acquainted with it under cultivation will kindly furnish an account of it for publication in GARDEN AND FOREST.—[See vol. vii., p. 206.—Ed.]

ROSA LÆVIGATA.—The Cherokee Rose is not a success in

English gardens, failing to flower even where it grows freely. Breeders of Roses here look upon this species as a likely one to cross with the commoner sorts. Lord Penzance records his failure to cross it in one year when he managed to get a few flowers. The distinct character of the foliage of *Rosa lævigata* would be an additional attraction to the Hybrid Perpetuals.

DIDYMOCARPUS MALAYANUS.—This is a new introduction of Messrs. J. Veitch & Sons, who exhibited plants of it in flower this week and obtained for it a first-class certificate. A figure of it has also been prepared for publication in *The Botanical Magazine*. The genus, which is closely related to *Streptocarpus*, comprises about seventy species, natives of India, Malaya and southern China. I have seen a considerable number of them tried as garden plants, but they do not thrive under cultivation here. Apparently, however, *Didymocarpus Malayanus* is an exception. It is not unlike the common *Streptocarpus* in habit, having green ovate hairy leaves and erect few-flowered scapes four inches high, the flowers nodding, tubular, two inches long and colored primrose-yellow. The plant requires stove treatment. No doubt Messrs. Veitch will try to cross it with *Streptocarpus*, and possibly with valuable results, the color of the flowers being novel. I believe the main difference between *Streptocarpus* and *Didymocarpus* is that in the former the valves of the fruit are spirally twisted, and in the latter they are straight. *D. Humboldtianus* and *D. Griffithii* are sometimes to be met with in cultivation.

ADIANTUM BESSONIANUM.—This is a new seedling or hybrid Fern which Mr. James O'Brien, of Harrow, has introduced from Trinidad and exhibited before the Royal Horticultural Society this week, who awarded it a certificate. It is supposed by some to bear indications of a hybrid origin from *Adiantum tenerum* and *A. trapeziforme*. The pinnæ are large, thicker in texture, more rounded in form and more crowded on the frond than in *A. trapeziforme*, while in habit the plant is more compact and crowded with fronds than either supposed parent. I should prefer to look upon it as a sport from *A. tenerum*, from which, in the opinion of Mr. Baker, *A. Farleyense*, *A. Lathomii*, *A. Ghiesbreghtii*, *A. Victoriae*, *A. Bansei*, *A. rhodophyllum* and *A. princeps* have probably all sprung. Whatever its origin or affinity, *A. Bessonianum* is a distinct Fern which is likely to become a favorite with growers of decorative Ferns.

ZYGOPETALUM GRANDIFLORUM.—A healthy plant bearing a raceme of two flowers of this rare species was shown this week by Sir Trevor Lawrence. It is remarkable as being the largest-flowered of all the *Zygopetalums*, and it is anomalous in having *Huntleya*-like flowers and pseudo-bulbs. Reichenbach called it *Batemannia grandiflora*. It was introduced from Colombia by Linden, and first flowered in this country about thirty years ago. The pseudo-bulbs are ovoid, furrowed, each bearing two leaves, which are lanceolate and about a foot long. The scape is about six inches long and bears from two to five flowers, each four inches across; sepals and petals equal, lanceolate, green, with longitudinal brown stripes; lip broad, three-lobed, white, with purplish raised lines and a semi-circular crest, conspicuously toothed and colored red and yellow. The top of the column is white. The plant is grown in a moist tropical house at Burford Bridge, where Sir Trevor Lawrence has an exceptionally rich collection of *Zygopetalums*, both tropical and temperate.

CÆLOGYNE SANDERIANA.—Reichenbach first described this plant in 1887 from specimens introduced from the Sunda Islands and flowered by Messrs. Sander & Co., St. Albans. It is one of the most beautiful species of this large genus, and when grown as was a specimen exhibited by Messrs. Sander & Co. this week its beauty is exceptional. The plant under notice bore six pendulous spikes, each carrying six or eight flowers, and each flower when flattened out measured nearly four inches across, and was colored milk-white with a few brown lines and a blotch of yellow on

the lip. The pseudo-bulbs in this species are ovoid, about three inches long, angled, wrinkled when old. The leaves are about a foot long and three inches wide. A cultural commendation was awarded to Messrs. Sander for their fine production. Coming from the Sunda Islands this species requires tropical treatment. Messrs. Sander & Co. grow it along with *Phalænopsis*.

DENDROBIUM MACARTHII.—One of the rarest and most beautiful of all *Dendrobiums* is this species, which is peculiar to the forests of Ceylon, from whence it has frequently been imported since its first introduction to Kew in 1855. No one has yet succeeded in keeping it in health in this country longer than two or three years; consequently, it has always been in demand. Collectors do not, as a rule, concern themselves over such nice botanical questions as the extermination of a plant from the wild flora of a country. On the recommendation of the Director of the Botanic Gardens at Ceylon the Government of that colony has, therefore, issued an order forbidding the collection of this and other rare Orchids in the Crown forests without a special permit. Sir Trevor Lawrence exhibited this week a well-flowered example of it, and it has also flowered recently in the tropical Orchid-house at Kew. Plenty of heat and moisture from June till November, followed by a rest of about two months in an intermediate temperature and dry atmosphere, are the conditions most congenial to it.

London.

W. Watson.

Cultural Department.

The Herbaceous Border.

Lychnis Sieboldii.—Of the several varieties of *Lychnis fulgens* the one known as *L. Sieboldii* is the most distinct on account of its pure white flowers. It is a Japanese variety of great beauty, growing a foot or eighteen inches high and producing its large flowers throughout summer if grown in sufficiently moist and rich soil. The petals are broad, slightly lobed, the corolla being more compact and rounded than in any other variety. The leaves are mostly ovate-oblong, shorter and more rounded than those of the species and covered with soft downy hairs. This variety is generally propagated by means of division, but it will also come true from seeds. It grows best in a rich and moist soil and prefers slightly shady positions. All varieties of *L. fulgens*, as well as the species itself, may be planted with excellent effect in the outskirts of woods or in open shrubberies.

Linaria alpina.—Visitors to the Alps or other European mountain regions cannot fail to notice a beautiful tufted plant growing in moist crevices of rocks and covered with attractive flowers of a deep violet-blue, with a bright golden throat. The leaves are linear, or almost terete, nearly an inch long and placed four in a whorl around the slender stems. The flowers, which measure about half an inch in length, are spurred and produced in terminal loosely capitate racemes throughout the summer. This plant is one of the most desirable and effective rock-plants, easy to grow almost anywhere and readily increased by means of seeds. If grown in exposed and sunny positions it requires an occasional watering to develop the best qualities. It thrives best in slightly shady places in a deep and moist fissure, or where it is protected by overhanging rocks or ledges, or close to a waterfall, where the air is moist and cool. Under favorable conditions it forms quite large tufts, and is then very effective.

Arnica montana.—From the latter part of June through the month of July, when American woods are almost devoid of flowers, the Mountain Tobacco, or *Arnica*, is one of the great attractions in all open deciduous woods in northern Europe. The flowers are about two inches in diameter, with numerous rather narrow ray-florets, of a very beautiful shade of yellow, between salmon and orange, abundantly borne on slightly leafy scapes eight inches to a foot high, which bear one or more flower-heads. The leaves are about six inches long, lanceolate, entire and quite smooth. They grow in tufts among the grass in high and dry woods, mostly in gravelly or sandy soil. The *Arnica* well deserves to be introduced in woods and natural parks. It may also be grown in a rockery with good effect. It is propagated by means of division or seeds.

Caccinia glauca.—This is a composite herbaceous plant,

growing from one to three feet high. It is of a robust, spreading habit, with thick glaucous stems and large glandulous leaves from three to six inches long, the radical ones very variable, but mostly spatulate or tongue-shaped, those of the stem elliptic or ovate, with coarse, hairy edges. The flowers are of a beautiful azure blue, an inch or more in diameter, with lanceolate, acuminate petals and a thick, fleshy and spiny calyx, collected in loose scorpioid racemes. The flowers are most abundant in June and July, but the plant flowers for a long period. It will grow well in a comparatively dry gravelly soil in exposed and sunny positions. The *Cacinia ripens* plenty of seeds and may easily be propagated by this means. It is a perennial and very hardy.

Dianthus cæsius.—This species, which is popularly known as the Cheddar Pink, looks very much in habit like a small Carnation, the leaves being very smooth and glaucous and growing in close, dwarf tufts only a few inches high. The flowers are deliciously fragrant, of a bright rosy-red color, borne singly on slender stems. The Cheddar Pink is very useful for edging flower-beds and borders, and is especially attractive in large masses in rockeries, or it may be planted in gravelly soil on

cuttings in a warm house it grows rapidly and forms stems which are square, with wavy wings, fringed with ciliate hairs on the angles. The leaves are of a pleasant light green color, three-parted, the divisions toothed; opposite the leaves are borne branched tendrils, which have the power of twining or clasping anything within reach. These tendrils also possess adhesive disks, like those of *Ampelopsis*, by which they can attach themselves to a smooth surface, or they sometimes insert the disks in crevices or cracks in the wall or wood-work, wedging themselves fast by accessions of cellular tissue. They are also interesting from the fact that they produce two to four long aerial roots from each of the joints of the stem. These are of a reddish color. They are from three to eighteen feet long, and would probably have grown longer if the roof of the house had been higher. On reaching the ground they shrivel at the tip and then produce a branch-root a few inches further up, but I only noticed one instance where the root took hold of the soil. They form a screen-like festooning which reminds one of the Japanese curtains in our houses. As the plant finishes its growth for the season and begins to ripen its stem a swelling takes place near the tip; this usually extends



Fig. 42.—Larkspurs in a Wild Garden.—See page 312.

bare sunny hillsides, a position in which it is generally found in a natural state. Like the Carnation, it may be increased by means of cuttings or layering, or more slowly by means of seeds, which should be sown in rich and porous soil in a cool frame and transplanted once or twice the first summer, after which it may be planted out permanently. It may be grown in any soil not too wet, but it retains its beautiful dwarf and compact habit best in poor soil and in open and sunny positions.

New York.

N. J. R.

Vitis pterophora.

A COUPLE of tubers of this *Vitis*, often called *gongyloides*, were received at the Botanic Garden of the University of Pennsylvania from the Cambridge Botanic Gardens, England. This is a very interesting plant to the physiologist as well as a suitable climber for the stove-house in summer. The species is indigenous to a few districts in Brazil and Peru, where it is usually found growing in the forests. Started from tubers or

through two joints. When fully grown it is oblong, about one inch in diameter, and of a dark green color.

When the stem is thoroughly ripened the tuber falls to the ground, and will grow if properly taken care of. This is probably the means whereby the plant propagates itself in its native habitat, and is, no doubt, the method whereby the species is preserved over a long period of drought. The tubers are tenacious of life, and instances are known of their retaining vitality for a year. Neither flowers nor fruit are known.

The old stem, if cut into pieces of two eyes each and placed in a pan of coarse sand, will root in about three weeks. These plants should be potted in four-inch pots in a rough loamy soil well drained. They need plenty of water and should be syringed freely once a day. When the roots have reached the side of the pot the plants should be shifted into seven-inch pots, in the same kind of soil, and staked up securely. They will grow in these pots for the summer if watered freely, but would be helped by another shift into ten-inch pots. They should be trained along the rafters of the roof, or they will climb along wires if left to themselves. The light green foliage

will provide desirable shade to the tender subjects beneath. It is decidedly a stove-house plant and will stand plenty of heat. The species is clean and not subject to any disease nor the attacks of any insect, so far as I have noticed—very desirable features in hot-house climbers.

Norway, Pa.

Alex. MacElwee.

The Davallias.

THIS extensive genus of stove and greenhouse Ferns supplies many beautiful and interesting varieties suited to different uses, as they range from a few inches to more than three feet in height. They look the best and are most at home in the rockery, where they creep and twine over and about the rocks; but all of them are more or less suited to pot-culture, while quite a number are well adapted for growing in hanging baskets or on blocks of cork. They are, generally speaking, plants of easy culture. They succeed better in a rather light situation than under heavy shading, but should always be protected from the direct rays of the sun. Probably the most practicable method of propagation is by division. Raising from spores is a somewhat delicate matter with a majority of the varieties. Even some of the more robust growers, such as *Davallia Mooreana*, are hard to procure by this method, while *D. Fijiensis plumosa*, though less robust and much finer in texture, comes much more readily. All the varieties, however, can be easily increased by division. The surest method is to procure fair-sized rooted portions of the rhizomes. Nothing is gained by making the divisions too small, with a view to procuring more plants, as the rate of loss is certain to be larger, while those that grow take much longer to become useful plants. If they once get into a stunted state it is generally difficult to bring them into healthy growth again. If grown as they ought to be, in a fibrous compost, the divisions can generally be removed with part of the compost adhering to the roots, and should be potted firmly in small pots half-filled with corks, in a mixture of fibrous peat and sphagnum. For the first few days a close shady situation should be provided and frequent sprinklings will help to keep them up until fresh growth has started. For the next shifts pans are preferable to pots, as they allow of freer drainage and prevent stagnation, from which *Davallias* suffer readily. For use in rock-work, well-established plants are required and great care must be taken that ample drainage is provided in pockets or crevices where they are to be placed. The compost for filling these pockets may be composed mainly of fibrous loam and peat in about equal parts, with a little leaf-mold and rough sand. The addition of a few broken pieces of charcoal and sandstone is of advantage, as they keep the whole as rough and porous as possible. The difference in the height of the many varieties provides plants suitable for almost any position in the rockery, the larger, of course, being suitable for the background and the smaller for the foreground. Watering is an important detail in the cultivation of these plants. In the rockery, especially, this is often carelessly done, the hose being turned on and an indiscriminate drenching given. By using the watering-pot moisture can be supplied in more suitable quantity and to the plants which need it. *Davallias* must never be allowed to suffer for want of water, but overwatering is equally hurtful. The compost named above is equally well suited for potting purposes.

Tarrytown, N. Y.

William Scott.

Midsummer in the Flower Garden.

HOLLYHOCKS are still in beautiful bloom. We find that we can keep up a succession of these flowers by transplanting some of them in May just before the formation of the flower-buds. This checks their growth, and it takes some time for the plants to become reestablished. By breaking off the tops of the flower-stalks the flowers are increased in size, and sometimes under careful cultivation they will, if so treated, throw out branches which later on will be loaded with bloom.

Pardanthus Sinensis has been blooming for a fortnight in a group with tall orange and red Lilies, with which it harmonizes perfectly. In the same company can be seen the white Snow-drop-like bells of *Hyacinthus (Galtonia) caudicans* and some large blue *Campanula*-flowers, and the whole mass makes a charming picture against a background of climbing Roses, now out of bloom, scrambling over a young Mulberry in the wild garden.

Another showy group for a wild garden is made up of bright scarlet *Lychnis*, deep red *Monarda didyma* and white *Achillea*, the Pearl, which last has the merit of holding its blossoms for several weeks. The ground here is carpeted with a little blue

Lobelia. Bare spaces of earth are not desirable in the borders, and it is necessary to spend some thought on the best selection of carpet plants. The most satisfactory plants for this purpose are not rampant growers, and they are better if they have rather inconspicuous bloom. Such plants as the old-fashioned small-flowered sweet *Mignonette*, *Woodruff*, annual *Candytuft*, Sweet *Alyssum* and the dainty little perennial *Tunica saxifraga* are good for this purpose. *Portulaca* makes a fine display on dry soils, but its bright many-colored blossoms do not always blend harmoniously with their surroundings.

Tall perennial *Phloxes* are coming into flower, and, while they are all showy plants, should be used by the planter with great discrimination. Some of the magenta and solferino colored *Phloxes* are in accord with few other flowers and ought to be weeded out wherever they appear. But a judicious selection of the many handsome white, light-colored, bright-eyed and carmine varieties make a showy bed, and these plants are particularly useful at this time for cut flowers. A mass of these is used by us against a background of limestone-rocks, and here the effect is good.

Rose Brake, W. Va.

D. D.

The Oak-leaved Hydrangea.—Our native *Hydrangea quercifolia* is one of the best of the *Hydrangeas*, although the large-flowered panicle *Hydrangea* from Japan is much more often seen in American gardens. Our native species resembles in its mode of flowering *H. paniculata* rather than its variety *grandiflora*, having a long thyrsoid panicle which carries on spreading branches a few clusters of perfect flowers and large sterile flowers at their extremities, which change slowly from white to a dull red. The Oak-leaved *Hydrangea* is a good shrub here all the year around, and in autumn its deep plum-colored foliage is very attractive. In Georgia and Florida, where it is found wild, it reaches a height of fifteen feet and becomes almost tree-shaped. Here it is rarely more than four feet high, a broad spreading graceful shrub, which flowers every year. It is not reliably hardy much north of this latitude, but another native, *H. radiata*, found in the Appalachian region of North Carolina and Tennessee, endures even New England winters, and it is a striking shrub for the snowy down which covers the under side of its leaves.

The Cornelian Cherry.—*Cornus Mas* is one of the oldest of cultivated *Cornels* and it is one of the best of exotic *Cornels* for American planting. Our native *Dogwoods* are all admirable shrubs or small trees, but none of them are so showy in very early spring as the *Cornelian Cherry* when it is covered with compact clusters of little bright yellow flowers disposed throughout the entire length of its branches. These flowers appear even before those of our native *Spicewood*, which, although it flowers with equal profusion, is not as bright in general appearance. The *Cornelian Cherry*, however, is a beautiful plant at the present season also for its mass of clean foliage, and later for its bright-colored fruits. Altogether it is one of the most satisfactory of small trees for American planting which come from central and southern Europe.

New Brunswick, N. J.

S.

Correspondence.

An Old Novelty.

To the Editor of GARDEN AND FOREST:

Sir,—One of the novelties offered in flower-seeds last spring was *Coreopsis Japonica*. Those who have sown this seed will be likely to be disappointed when their plants blossom. We procured seed from two reliable seedsmen, and expected to add another species to our collection of *Coreopsis*. The plants are in bloom now, and prove to be a native species that has been grown in gardens for many years, and known as *Helenium tenuifolium*. It is an annual plant, and in Gray's *Synoptical Flora of North America* is said to grow from Arkansas to Mississippi, Florida and Texas, becoming a naturalized weed throughout the southern Atlantic states. It would be interesting to know if these seeds were collected in Japan or if some one has deceived American and European seedsmen. We had one package of seeds from a reliable seedsmen in England and another from one in Boston. The plants from the two packages, which were kept separate, are now in bloom, and they are exactly alike. Means should be taken to find out where this seed came from originally last spring. A way to guard against an evil like this would be to put the author's name after the specific name—that is to say, when a person offers a novelty and calls it a new species he ought to give his name, and this should be put on every packet of seed sent out. Another novelty sent out in seeds last spring is

Campanula Japonica. We have seedlings of this plant, but they have not blossomed yet. The plants look now much like seedlings of *Platycodon grandiflorum* growing near-by. Were these sent out by the same enterprising person who introduced the so-called *Coreopsis Japonica*?

Botanic Garden, Harvard University.

Robert Cameron.

Notes from Germantown.

To the Editor of GARDEN AND FOREST:

Sir,—In the flower-border the double-flowered *Hemerocallis fulva* is one of the showiest plants now in bloom. Double flowers of this class are not, as a rule, attractive, but these flowers last longer than those of the species and they make a much finer display.

It ought to be more generally known that *Tritoma uvaria* is quite hardy here. Some of these plants are now nicely in flower and they have been unprotected for two winters past.

The double-flowered *Rudbeckia*, called Golden Glow, is displaying its first flowers. They are a good clear yellow and quite double, and from the number of buds appearing the plants promise to make a good display later on.

Passiflora incarnata is in flower. It lives out-of-doors here only when leaves are placed about it in winter to prevent the frost from getting to the roots. When we treat our plants in this way we are rewarded with an abundance of beautiful flesh-colored flowers.

Germantown, Pa.

Joseph Meehan.

California Fruits at Home.

To the Editor of GARDEN AND FOREST:

Sir,—Nearly all the fruits of California now find their way east, and even to England, where they are gradually winning wider markets. Enterprising growers have partially succeeded in devising methods of shipment which carry the different fruits to the consumer in satisfactory condition. A statement of the prices and qualities of these handsome fruits where they are grown may interest the eastern reader. Many persons in selecting southern California as a place of residence count the luxuriance, the abundance and the cheapness of its fruits as one of the principal inducements, believing that a plentiful supply of fresh fruit every day, as an article of diet, is healthful and wholesome as well as enjoyable.

In California, as elsewhere, the larger towns always have the greatest variety of fruits in the market, because they draw their supplies from all of the smaller places, most of which have their specialties. The choicest fruit also, and the earliest, naturally seeks the largest market. San Francisco, for instance, buys fresh figs from Palm Valley, an isolated and torrid nook in the mountains adjacent to the Colorado desert, some weeks before they appear in the markets five hundred miles nearer the place where they are grown. These early figs bring fifty cents a pound. In the same city oranges have been offered at from eight to ten dollars a box a month in advance of the ripening of the crop in southern California. These oranges were grown in Salt River valley, Arizona, but the supply is very limited.

The winter supply of fruit is, of course, less than that of the summer. Few persons in California eat oranges before the first of February, although, nominally, they may be had in any month. They are at their prime between the first of March and the first of July. The strawberry, in favorable years like the two seasons last past, is in market every month. The winter fruit is usually large and handsome and takes the eye of the tourist, but it is not sweet and wholesome until about the first of March, when the warmer suns of spring give it more sugar and a better flavor. In April, when strawberries usually sell in New York for sixty cents a quart, they retail in southern California for eight cents, and the first crop is at its best. There are three principal crops a year, with short intervals between. In the winter, when scarce, they usually sell for twenty or even twenty-five cents a box. They are in good flavor from March to Christmas and frequently sell as low as four cents.

The apple is, as everywhere, a principal winter and summer fruit. Apples of excellent quality are grown in the higher lands, both in the north and the south, but not in sufficient quantities to supply the home demand. In the south they first appear about the middle of July and are in market until the following May. In the fall large quantities are imported from Oregon and other states. Three cents a pound is considered cheap for good sound fruit, and eight cents is about as high as the price goes, apples then being regarded as a luxury for the rich. Figs, pears, guavas, grapes, Japanese persimmons, lemons and limes, with imported pineapples and bananas,

make up, with the apples and oranges, the bulk of the winter display upon the fruit-sellers' stalls.

In April the loquat makes its appearance, the earliest fruit of the year and one of the least desirable, except as a novelty. It is a small, oblong yellow fruit and contains two huge seeds, which make up the bulk of the material inside of the tough skin. It has an odd, subacid flavor which some people affect to enjoy, but it is not a fruit of commercial importance, either at home or abroad. Currants come late in May. They are not grown to any extent in southern California, and command a price which is considered high, rarely selling for less than ten cents a pound. Memories of the currant jelly of the east bind many housewives to the practice of purchasing them, no matter what the price may be. In June several fruits are added to the slowly increasing list. First, we have cherries; the earliest are imported from the north and bring twenty-five cents a pound. These are the same brilliant, glossy, highly flavored cherries that bring fancy prices in the east. The black varieties are the first, but are soon followed by the white, red and yellow sorts in great profusion. None of them sell, however, at less than ten cents a pound. It has been found that cherries flourish at the same altitudes and on the same soils as apples, and very fine fruit is now being grown in southern California in the mountain valleys at an altitude of about three thousand feet. Here the Black Tartarian and the Governor Wood flourish admirably. In the north this favorite fruit has been brought to great perfection and has always repaid its cultivators most handsomely. After the cherries, in June, come apricots, peaches, raspberries, blackberries, dewberries, plums and prunes. In July we get the first fresh figs, nectarines, pears, melons and grapes, and all these fruits, with the additions later of pomegranates and persimmons, last until the first of December or even longer.

The black raspberry is rarely seen in California markets, and in many portions of southern California the red raspberry is a recent fruit. This, doubtless, is due to the fact that people were too busy at first in the new towns with matters of greater importance to pay much attention to small fruits, for the red raspberry as grown here is delicious and produces profusely. There are many varieties of blackberries and dewberries. These small fruits usually bring fifteen cents a box when they first appear and drop quickly to eight or even five. California apricots and peaches cannot be had in perfection in the east. They must be grown with little or no irrigation and fully ripened on the tree to be at their prime. Then they are truly delicious. They are very cheap, retailing most of the season at two cents a pound, or even less. The luscious and varied California grapes are also sold at the same low price as apricots and peaches. Fresh figs are also very cheap after they have ceased to be a novelty. Favorite varieties of grapes in the home market are the Sweetwater, the Muscat and the seedless Sultanias of the white sorts; the Rose of Peru, the common Mission, the Black Morocco, the Black Hamburg and the Cornichon of the darker varieties, and the ever-popular Flame Tokay. Some of the highly perfumed eastern sorts are grown in California with moderate success. But most of these varieties require trellising, and this is a refinement as yet beyond the average hurrying Californian. He prefers to cut his vines back to the stump every season rather than to train and prune them over trellises.

Bananas are imported from points in Central and South America and from the Hawaiian Islands. They usually retail at thirty cents a dozen and are in the market practically all the year. The red sort is never seen in California. Pineapples are brought from Florida in the winter and from the Hawaiian Islands in the summer. They are always expensive, selling at from fifty cents to a dollar and twenty-five cents each. Pears are always cheap in California. The Bartlett is the favorite, but Winter Nelis and Seckel are later varieties that find ready sale. The huge, ungraceful Pond pear is grown and sold as a curiosity and frequently attains a weight of three pounds, but is not valued for its flavor. It is useless to enumerate the varieties of plums. This brilliant, showy fruit adds greatly to the beauty of the fruit-seller's display. These fruits bear transportation and are familiar to the eastern consumer. The common prune when ripe and fresh is delicious and sweeter than many of the other plums. Melons are produced by the thousands of tons, both north and south. In the smaller towns they quickly come down in price to the small sum of five to ten cents each, at which they can be bought during four or five months. The muskmelons enjoyed in San Francisco are among the pleasantest recollections of a residence in that city—great, handsome, juicy, highly colored, delicately flavored fruits, in unequalled variety. I do not think that better melons can be raised in any part of the world.

The flavor of the nectarine is between that of a peach and a plum, and it has, I think, more acid than either of those fruits. It is grown more for drying than for consumption when fresh. Like the other fruits of its class, it is sold at a very low price. Persimmons, pomegranates and pomelos are offered for sale, but they are all among the fruits that one has to learn to like, and the demand is, therefore, limited. Californians are still shy of the pomelo, which has long been considered a door-yard curiosity, and the average buyer hesitates at paying from five to ten cents each for these tart, ill-shaped monstrosities. Probably they do not yet appreciate this fruit at its true value except in a commercial sense. The pomegranate makes an attractive table decoration, but the task of extracting nutriment from its pretty red seed-cells is a tedious one. The persimmon is a mushy thing, and not in popular favor among so many better fruits. The Guava is a perennial producer, but sells best in the autumn; the Strawberry variety, in particular, has a very delicate flavor. It is not particularly popular as a fresh fruit, being cultivated principally for the delicious amber-colored jelly made from it. The cherimoyer, or custard-apple, is said to be grown in a few localities successfully, but it does not appear in the markets.

The prices here quoted are the ordinary average retail rates. Under unusual conditions they may be higher or lower. It will be seen that one need not have a very long purse or take the trouble to grow his own fruits in order to enjoy an abundance of the very best. The customary retail price of oranges during the season is from ten to twenty-five cents a dozen, except on the stands that cater principally to the tourist trade, where the prices are doubled. In the orange-growing districts nearly every door-yard has its trees to grow fruit for home use.

California is becoming known for fruits, flowers and fiestas. Its flowers are certainly beautiful. Its fiestas, or gula days, are more elaborate and more numerous every year, and afford innocent entertainment to thousands of residents, both permanent and temporary; but its constant succession of varied and luscious fruits is a pleasant feature of life in California even greater than these others, because it is one which all can appreciate.

Redlands, Calif.

Wm. M. Tisdale.

The Arrangement of Flowers.

To the Editor of GARDEN AND FOREST:

Sir,—My garden lies in a hidden corner at the foot of a steep hill, sheltered among the evergreen Balsams and graceful Birches. It is a long terrace, sloping to a short level space, and losing itself in the deep woods beyond. It is a wild, old-fashioned garden, flowers growing from the top of the steep terrace to the bottom, and they seem to fall like a curtain to the path at the foot. A flight of stone steps leads from the top of the terrace to the flower-beds below. Looking over the lovely mass of flowers I wonder how to cut and arrange them to their best advantage, and Nature herself answers and teaches me.

In one corner a long row of brilliant carmine perennial Peas blooms profusely, and hundreds of buds open to the sunshine every morning. Below them, its branches all about and over them, grows the dainty veil-like Baby's Breath, *Gypsophila paniculata*, Nature seemingly weaving it in and out among the Peas to soften the glow of their vivid color. In this way I arrange them in the house, using glass vases so as not to take away from the delicate effect of the whole. Filling the bowl with clear spring water I place the clusters of Baby's Breath first, and then arrange one by one the Peas, until it all looks like a small piece of the garden outside.

Near the woods, in a dark corner, grow the Pansies, the always cool atmosphere keeping the flowers large and rich all through the summer. They grow in bunches, and dozens of the rich clusters stand up together. Back of them, a little way in among the trees, are thick beds of soft, damp moss, with here and there a delicate Fern. Growing so near together, it strikes me that nothing can be better to bring out the beauty of the Pansies than the bed of spongy Moss. Placing a piece of it on a long platter or round dish, with the little Ferns fringing the edge, I saturate it with water, and then stick in one by one the Pansies, pushing the stems down into the moss until hardly a glimpse of it is to be seen.

Hundreds of scarlet Poppies grow on the sunny slopes, blooming among waving tufts of grass; next to them are the clear yellow fairy-like Iceland Poppies and the bright blue Corn Flower. A few field Daisies have found their way into this mass of color; one would have blind eyes, indeed, not to perceive that with these materials could be fashioned a bouquet

that would tempt a French woman to put it in her bonnet and remind the German of his fatherland. In a tall glass vase scarlet Poppies are arranged with waving Grasses, yellow Iceland Poppies looking like huge sunny Buttercups, German Corn Flowers and field Daisies. The effect is like a little piece of foreign lands brought into New England.

As the season advances the Sunflowers open their great smiling heads to the sun; something must be done with them; they, too, must do their duty in decorating the house, but how? They are so large and stiff that it is a hard problem to solve. Nature has done it for me; a cluster of Golden-rod, uninvited and uncared for, has persistently taken its place among the finer flowers. I take the hint, and in a bunch of stiff Sunflowers mix those graceful, fringing heads, softening down the unyielding mass until the whole has become a delight to one's eye, and to memory long after the bunch in reality has faded.

The lessons in my garden have been many and never-ending. To lighten up a bunch of dark-colored Pansies with a few light yellow ones, or bring out the pink tints of the cinnamon Rose by combining it with the delicate Forget-me-not, Nature may have already taught you. Many flowers show off their beauty best alone, some in great masses, and some in clusters of a few. Every one knows how to arrange them by themselves; these few examples are to call attention to arranging different flowers into happy combinations. The beauty of a flower is often enhanced when it is helping to bring out the beauty of other flowers.

Rangeley, Maine.

Dorothy Root.

The Forest.

The Burma Teak Forests.—I.

IT has been suggested by my friends in the United States that an account of the first introduction of regular forest management, forty years ago, in the Burma Teak forests, might be useful to those who desire to see good forest management established in North America, and particularly to those who are themselves working in this direction and endeavoring to make the forests a source of steadily increasing wealth instead of devastating them. Some of the readers of this paper may feel an interest in Burma because there it has been given to the self-denying labors, to the faith, charity and courage of American missionaries, beginning with Adoniram Judson, to convert the larger portion of the Karen tribes into one Christian nation, rising steadily in morality, in education, and in power, and to spread the light of the gospel also among Burmans, Chins and Shans.

But apart from those who are actually engaged in forest work, I am afraid that this paper may not be more interesting than my previous communications on forest management in Germany. The subject is heavy, and hardly admits of light popular treatment. In forest management we cannot do without facts and figures, and these are not entertaining. Instead of dry facts and figures I would gladly place before the reader a picture of the woods in which the Teak-tree grows, in company with a great variety of other trees, mostly towering over dense Bamboo forests, pleasant and shady in the beginning of the dry season, from November to January, when the dew is heavy and everything is fresh and green; black and desolate in March and April, when everything is dry and parched, when the jungle fires have passed over the ground, the trees are leafless and the rays of a fierce sun are almost unbearable—green again during the rains from May to October, when the broad pyramidal flower panicles of the Teak-tree, with small white flowers on numberless slender branchlets, make their appearance among the large leaves at the ends of the branches. It would give me pleasure to describe another class of forest: with ground carpeted with a variety of herbs and Ferns, *Pteris quadriaurita* being prominent, while large, bright green funnels of *Asplenium Nidus* nestle between the branches of the Teak-tree and huge specimens of *Platyserium Wallichii* are attached to the trunk.

More interesting, even to the gardener and botanist, than the Teak-producing tracts, would be those where the Teak-tree is absent, the extensive gregarious forests of *Dipteroraynus tuberculatus*, the Eng ben of Burmans, during the hot season the branches covered with a profusion of gorgeous tree Orchids, while during the rains, between the large leaves of the young Eng plants, the ground is carpeted with a wonderful display of showy and delicate species of *Impatiens*, all in full flower; or the evergreen forests of Tenasserim, forming a dense unbroken mass of foliage from the ground upward to a height of 200 feet, the space between the old trees being filled with shrubs that thrive in deep shade, and with young growth

of the various trees which constitute the forest. These young plants grow very slowly, waiting until one of the old giants falls, when they push up rapidly toward the light and eventually fill up the gap. Scattered here and there, huge specimens of *Antiaris toxicaria* raise their round massive heads to a height of 250 feet from the ground.

What I should like better still would be to invite the reader to leave behind the hot forests of Teak and *Dipterocarpus* of the Sitang valley, and to ascend with me the hills east of Toungoo, passing through fields and gardens of prosperous Christian Karen villagers, among whom, shortly before I came to Burma, drunkenness, idleness and deadly feuds were the order of the day, and where the work of American missionaries and their faithful Karen assistants have introduced order, industry and sobriety. Here the crests and slopes of the higher hills are occupied by extensive evergreen forests, partly *Pinus Khasya*, often with an underwood of *Cycas pectinata*; partly, a great variety of Oaks, Chestnuts, *Magnolia* and other trees, the underwood consisting of species of *Rhododendron* and large shrubs of *Vaccinium*, all in full flower, with the curious Fern, *Brainea insignis*, and tufts here and there of large-flowered *Cypripedium*.

Such an account of the Burma forests might possibly please the readers of GARDEN AND FOREST; but, unfortunately, Forestry is not Botany, it is hard and dry business, and moreover it is business of a peculiarly difficult and intricate character.

PLANS FORMED.

In January, 1856, I took charge of the Teak forests of Pegu. Teak forests they are called, but the Teak-tree only forms a small proportion of the forest. In most cases trees form the upper story of the wood, while the lower story consists of a dense mass of Bamboos, from thirty to sixty feet high. The constitution of these forests has of late years been carefully examined in a large number of districts, and it has been found that the proportion of Teak to other trees, not counting Bamboos, as a rule varies between ten and twenty per cent. Taking the Bamboos into account, it may be said that Teak hardly ever forms more, and, as a rule, much less than ten per cent. of the entire growing stock. A remarkable fact should here be noticed. On the island of Java the Teak, there called *Djati*, forms pure forests of considerable extent, in which very few other trees are found. In Burma, in Siam and in the western peninsula of India, the Teak, unless planted, forms pure woods only under exceptional circumstances, here and there, on deep alluvial soil in valleys or in the plains.

The chief aims, which I had proposed to myself in 1856, were threefold: (1) To protect and, as far as possible, to improve the forests, to arrange the cuttings so as to keep well within the productive powers of the forests and to ensure a permanent and sustained yield from them. (2) To make the inhabitants of the forests and the people in the vicinity my friends and allies. (3) As soon as possible to produce an annual surplus revenue.

The province of Pegu had been annexed to the British Indian Empire in December, 1852, in consequence of a war which the then King of Burma had provoked. Lord Dalhousie, at that time Governor-General of India, was a real statesman. Rangoon, the capital of Pegu, had long been known as an important place for the export of Teak timber, and Lord Dalhousie had determined that this source of wealth should not be wasted but should be preserved. I landed in Calcutta in December, 1855, and fortunately at once found opportunities for obtaining information regarding the state of things in Pegu, and for framing a general plan of action. The outlines of this plan I had the honor of submitting to His Excellency. Lord Dalhousie listened with great attention, and when I had concluded, he said: "Dr. Brandis, if you succeed in carrying out these excellent plans, you will confer a lasting benefit upon the people of Pegu. I hope you may succeed, and you will have my full support in the matter. I hold it to be the duty of the Government of India to preserve the forest resources of Pegu and not to allow them to be wasted as the forest resources of other provinces have been wasted. Unfortunately I must leave India soon, but I trust that my successors will take the same view as myself of the Pegu forests. Should it, however, thus happen that at any time the Government of India were not fully alive to the necessity of preserving the forest resources of Pegu, I hope that you will remember what I have told you."

Lord Dalhousie left India in March, 1856, and died in 1860. Those who may have the patience to follow me through the history of forest management in Pegu will see that had it not

been for Lord Dalhousie's words the whole undertaking would most probably have come to nothing. And there was another point: Lord Dalhousie had selected the very best man for the government of the newly acquired province, Major (afterward Sir Arthur) Phayre. Through the wisdom and determination of that great and good man, Pegu was speedily converted from one of the most unruly and wild countries into a flourishing and well-peopled country. What the population of Pegu was at the time of annexation is not known. In 1856 it amounted to 700,000, and in 1881 to 2,500,000.

Under the orders, and with the unchanging cordial support of Major Phayre, I gradually put my plans into execution. A few days after landing at Rangoon I selected a large area, with one and a quarter miles of river frontage, above the town, where I established a timber depot for the collection and sale of the timber to be brought down from the forests. At that time Rangoon was a small place and the land then made over to me for forest purposes was of little value; it is worth several millions now.

At annexation the Teak forests had, by proclamation, been declared the property of the state, and this was in accordance with established custom, for under the King of Burma Teak had been a royalty, all Teak-trees were the property of the King, and Teak timber was a monopoly. So far the position of the Government was safe on paper. But I knew that something more was wanted, and that the most effective plan for acquiring full control of the forests would be to keep all operations in the forests in my own hands, to bring out the timber on Government account, and to sell it at Rangoon by public auction. This plan I hoped would enable me to give the inhabitants of the forests and the people who had hitherto done the work of dragging and floating the timber profitable and steady employment, and thus would make them my friends and allies.

Bonn, Germany.

Dietrich Brandis.

Recent Publications.

Seventh Annual Report of the Missouri Botanical Garden. Published by the Board of Trustees, St. Louis, Missouri.

The Missouri Botanical Garden now contains 301 named species of trees, 561 named species of shrubs and 1,129 named species of hardy herbaceous perennial plants. The herbarium includes nearly 250,000 specimens, being fairly representative of the vegetable life of Europe and the United States, with many specimens from less accessible regions. In a circular printed last May and reprinted in this volume, Dr. Trelease called attention to this material for the study of botany, and adds that every facility will be given to advanced students who wish to make researches in botany and the cognate sciences. The herbarium is especially rich in certain named groups which have been monographed by the late Dr. Engelmann and others, and it is supplemented by a large collection of woods. The library contains some 8,000 volumes, 10,000 pamphlets, and this report includes a carefully prepared catalogue of the pre-Linnean library which was presented to the garden by Dr. E. Lewis Sturtevant, of South Framingham, Massachusetts, and consists of nearly 500 selected botanical works which were published before the time of Linnaeus. We are glad to learn that these rapidly accumulating facilities invite more investigators every year. It is gratifying also to know that the receipts from the magnificent endowment were larger last year than ever. Besides the catalogue of the pre-Linnean library, this report contains a study of the Juglandaceæ of the United States, by Dr. Trelease, with twenty-five full-page plates, a study of the Agaves of the United States, by Miss A. Isabel Mulford, with thirty-eight plates, and a monograph on the ligulate Wolfias of the United States, by C. H. Thompson. Some of the reproductions of photographs are excellent examples of what can be done by process work. There are many others which show with equal clearness that no process can make a good picture out of a bad photograph. In works of permanent value, therefore, where photography is employed, perfection in detail is essential, and this can only be assured when a lens of the best quality is used by a skilled operator.

Notes.

At the sale of the second large shipment of California fruits to England this summer better prices were realized last Friday than in the previous week. Bartlett pears brought from \$1.43 to \$1.87 a box, and plums advanced fifty cents a box.

Well-blanching celery is now coming from New Jersey, western New York and Michigan, and costs fifty cents for a dozen stalks. Asparagus may still be had at twenty-five cents a bunch. The quality of tomatoes offered has improved within the past fortnight, and smooth firm specimens of such sorts as Acme and Beauty cost fifty cents a half-peck.

The leaves of one of our Golden-rods, *Solidago odora*, are used in some parts of the country as a substitute for tea. In the last number of *Meehans' Monthly* it is stated that the plant is in very common use by German families of the interior of Pennsylvania. It is even an article of trade. Men gather the leaves in summer-time and peddle them from house to house in the winter.

Lord Penzance last year cut the hips from some of his hybrid Sweet-briers rather late in the season, in order that his plants might not be exhausted by ripening the fruit. He was surprised to find that most of these plants bloomed freely a second time in late summer and kept flowering until severe frost. It is suggested that if the flowers had been cut as soon as they faded the autumnal flowering might have been still more abundant.

In former volumes we have called attention to *Isotoma longiflora*, a perennial plant from the West Indies, and belonging to the Lobelia family. It is quite distinct and showy in late summer, bearing snow-white long-tubed flowers more than an inch across. In the last number of the *Florists' Exchange* Mr. Oliver calls attention to the fact that this plant blooms at the same time with its relative, our native Cardinal-flower, and the two when planted together make a very effective combination. Plants will grow abundantly the first year if seed is sown early enough.

It is well known that late Peas often suffer seriously from a mildew, *Erysiphe communis*, a near relative of the powdery mildew of the Grape. The disease not only attacks the leaves, but the pods, stems and leaf-stalks, so that the entire plant seems to be covered. Frequent cultivation mitigates the trouble somewhat, but not entirely in hot dry seasons, so that it is good practice to sprinkle, or better, to spray the plants with a solution of copper sulphate at the rate of one pound to 500 gallons of water. This prescription is recommended in a bulletin of the Michigan Experiment Station.

The Angelica Tree, or Hercules Club, *Aralia spinosa*, must be seen in the Big Smokies before its beauty can be fully estimated. There in the rich soil along the streams it often has a trunk eight inches in diameter and becomes a tree with wide spreading branches and thirty-five feet high. It is just flowering now in Central Park, and its immense feathery panicles of white flowers, with their lilac fragrance, arrest the attention of every visitor. It is interesting at every season for its armor of large prickles, its broad, graceful decompound leaves often a yard across and its enormous panicles of black fruit.

Refrigerator-cars are indispensable in these days when fruits and other perishable products are to be transported to any considerable distance, but their use is expensive and ice makes much additional weight. Many experiments have, therefore, been tried to discover some better and cheaper method of carriage for long distances. In California fruit has been transported in tight cars filled with some gas in which the microscopic germs of decay cannot live. For some reason this method has not yet proved practicable. The latest experiment in this line is a car built of wood and paper with several dead-air spaces and a live-air space at the floor-level. The car is then filled with sterilized air, or air in which the germs of the various ferments have all been killed. This air is pumped from the locomotive into the train after having been heated until it is sterilized. Before it gets into the car it passes through a coil of pipe surrounded by ice and is thoroughly cooled. The air is drawn out by another pump, so that the car is kept constantly filled with a fresh supply of sterilized air. The inventors have much faith in this project, but it has not been tried to such an extent as yet to prove its practical value.

The occurrence in the stomachs and intestines of horses, cattle and sheep of balls composed of hair taken into the stomach little by little while animals were licking their coats, is well known. Balls made up of plant hairs—that is, of the

so-called beards or awns of oats, barley or other grain—have also been reported. Crimson Clover has long been used in Europe as a forage-plant, and nothing appears to have been published there regarding its liability to form such accretions, but a leaflet recently prepared by Professor Coville, of the Department of Agriculture, records several instances where horses have evidently been killed in this way. The mature calyxes of Crimson Clover, as well as the stalks, are covered with hairs one-eighth of an inch or less in length, and they are stiff and barbed. If overripe clover is fed to horses there is danger that these bristly hairs will accumulate in the stomach and intestines in spherical balls, which will increase in size and hardness by addition of the same matter to their surfaces. When a ball has reached a sufficient size, whether after a few days or several weeks, it closes up the intestines, and after several hours of intense suffering the animal dies. Since the hairs on this plant do not become stiff until it has passed the flowering stage, it should never be fed to animals after it is fully ripe. Of course, the practice of feeding the straw of this clover after it has ripened and has been threshed for a crop of seed is dangerous. These Clover hair balls are often four inches in diameter, with a surface texture like fine, firm felt.

Raspberries are now quite out of season and currants are past their prime. Blackberries are no longer at their best, Staten Island and the Hudson River furnishing the bulk of supplies, which bring fifteen cents a quart for the choicest. Huckleberries, from the Pocono and the Shawangunk Mountains, are still plentiful, and cost thirteen cents a quart at retail. New apples include such varieties as Nyack Pippin, Orange Pippin, Sweet Bough, Sour Bough, Astrachan and Duchess of Oldenburg. Much of this fruit is immature and small, but barrels of large hand-picked specimens sell for \$1.25 to \$1.75 in the wholesale markets. Sound showy Willow Twig apples, from last year, held over in cold storage, are still occasionally seen. These are sold at sixty cents a dozen. Other out-of-season fruits are Hart's Late oranges, from California, and grape-fruit from Jamaica. New limes are plentiful and sell for seventy-five cents a hundred at retail. Pineapples cost from fifteen to fifty cents each. Georgia peaches, which continued until the first of August, are now succeeded by Troth, St. John, Mountain Rose and Crawford varieties, from Maryland and Delaware. With the last Le Conte pears from the south the first Keiffers are appearing. Bartlett's of good size and color are coming from New Jersey, and also such kinds as Catherine, Bloodgood, Clapp's Favorite, Bell and Scooter. Concord grapes, from Georgia, may now be had, and Niagaras and Delawares from North Carolina. The stock of muskmelons from Maryland, Delaware and New Jersey is below the average in quality this season. Altogether the finest specimens seen here this year are in occasional small shipments received from Montreal. These large, heavily netted fruits sell for \$1.00 apiece. Watermelons are becoming less plentiful and are declining in quality; large ones cost fifty cents each.

All readers of Mrs. Alice Morse Earle's *Customs and Fashions in Old New England* will turn to her article entitled *Old Time Flower Gardens*, in *Scribner's Magazine* for August, with the assurance of finding a trustworthy statement of facts, combined with a most pleasant play of fancy. The illustrations are singularly effective, and they help the text to carry us back to the days when Johnny-jump-ups, Flowers-de-luce and Bouncing Bet were to be found every year in the same place in the home garden. Perhaps, if we could see some of these old gardens reproduced to-day the actual flowers would be less fair than those which we see in memory, but there are some suggestions from these colonial times which even the modern artist in landscape would do well to heed. Fortunately, the best of the old plants are good plants still, and, perhaps, they are more abundantly planted now than they ever were. Mrs. Earle makes out a long catalogue of what was to be found among the plantings of the Puritans in New England, what the Dutch women cared for in New York, what such flower lovers as John Bartram and Edward Shippen made abundant near Philadelphia, and what were found in the beautiful terraced gardens about Virginian homes. The persistence of some of the old-time plants is noticed by Mrs. Earle as one of their strong traits. And there is poetry as well as pathos in her statement that the sites of colonial houses now destroyed, and the very trend of the old roads, can be traced by the cheerful faces of these staying flowers which have escaped from the trim gardens where they were once planted. The situation of old Fort Nassau, in Pennsylvania, so long a matter of uncertainty, is said to have been definitely determined by the familiar garden flowers found growing on one of these disputed sites.

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The Proper Work of Experiment Stations.

IT is only twenty years since the establishment of our first state agricultural experiment station, and now there are more than fifty of them, manned by nearly six hundred persons, and costing a million dollars a year. This implies a substantial taxation of the whole people in the interest of the farmer, but it is only one part of a system which has been organized for his instruction. Besides the various land-grant colleges, the shorter agricultural courses in most of them, the farmers' institutes and migratory dairy schools, there are boards of agriculture with paid secretaries, and exhibitions of crude and manufactured products, all of which, together with the agricultural and scientific press, are endeavoring in one way or another to instruct the farmer in scientific truth, or in manual practice.

The resultant of all these educational forces will, of course, be most beneficent when they are properly correlated—that is, when all together provide the most comprehensive instruction, and when each is doing what it is best fitted to accomplish. Now, what shall be the specific place of the experiment station in this scheme? Very plainly, the basis of the whole structure should be accurate scientific knowledge. There is abundant room for the so-called practical man to report the results of his work. But, after all, the one thing most difficult to discover, and the one thing most useful to know, is the laws and facts—that is, the pure science—which is to be found at the root of all successful practice. The stations are supposed to be officered by men who have the training and temper which fit them to do this work. They constitute a body of skilled investigators who have opportunities and equipment for this work which no one else possesses to such a degree. It would seem clear, then, that the more closely the stations adhere to the primary purpose for which they were created the more thoroughly they will do their part in this complex system.

We have lately read two papers which, from different standpoints, give support to this view. One of these, entitled "Permanent Elements in Experiment Station Work," was read by Dr. A. C. True, before the Association of Agricultural Colleges and Experiment Stations; and the other, entitled "Conservatism in Scientific Agriculture," by Dr. W. H. Jordan, at Trenton, New Jersey. Dr. True's paper is primarily

a protest against the shifty methods of appointment and administration as now practiced, and a plea for a permanent tenure of office among the station workers, without which there can be no unity and continuity of purpose, and no esprit de corps, to insure loyalty and enthusiasm. Dr. True added, and he might have added with greater emphasis, that a permanent staff, or at least a well defined and persistent administrative purpose, is needed because the most important investigations of the station are those which must be carried on over long periods of time. Of course, all this work must be executed with faithfulness and the results recorded with accuracy, but the final answer to the tests which are made may not be given for years; and it is this patient waiting, this refusal to adopt what is partial and temporary as finally and entirely true, which gives experimental work its genuine value. The individual farmer cannot prosecute investigations of this sort; neither can societies which are made up of practical farmers and gardeners. They can only be conducted by persons who are devoted to this line of work exclusively. And this means that the best and most effective work of the stations will be the study of principles which may take years to establish.

Dr. Jordan goes a step farther. He admits that it is a true function of a station to show in what way existing knowledge may be utilized by experiments which serve as object-lessons. He might have added that wherever principles are known and established it is the proper function of the station to publish them as widely and reiterate them in as many ways as possible, so long as real knowledge is disseminated. But he states truly that some of the conclusions published by the stations on the basis of hasty tests will find no place in the permanent records of scientific progress except as warnings. The people who pay for this work are impatient to see something for their money, and they drive the stations to field trials of fertilizers, to experiments in feeding animals, conducted so loosely and hastily that no safe conclusions are possible. This means that there should be less haste in promulgating conclusions which have not been reached by a rigid inquiry. It means that the stations shall not be nervously anxious to show some immediate and apparently practical results when they ought to be making more severe scientific investigation. Such inefficient station work is negatively bad, because it is done at the sacrifice of time and opportunity which are needed to search out the fundamental truths of pure science, and it is positively bad, because wrong teachings mean delay and disaster in agricultural practice. The people are blameworthy for much of the crude station work, because they are impatient while their teachers are making what seems to be slow progress in solving nature's problems. It is true, as Dr. Jordan states, that the work which lives longest and exerts the greatest influence upon the art of agriculture is of that purely scientific kind that is carried on with infinite pains in the laboratory by men who do not themselves appreciate what will be the far-reaching influence of their labor.

The stations in this country have already done an inestimable amount of good for agriculture in helping the farmer to repel the attacks of insects and of diseases which injure his crops, in improving the quality of his fertilizers and foods, and in many other directions, and when we remember how few men there are in the country who are competent to make experiments and deduce from them scientific principles, it is more than surprising that they have accomplished as much good as they have. Every year, however, it should be less difficult to secure an efficient staff, and every year there is less excuse for wasting time with inconsequential plat trials with fertilizers, or comparative tests with peas and strawberries. That the stations have done as well as they have is due to the fact that they have so generally adhered to the strict line of scientific work. The more closely they confine themselves to work of this sort, the more certainly the results they achieve will educate the farmers of the country up to the belief

that their hope is not in luck or in guesswork but in exact knowledge, and they will then turn naturally for help to these institutions instead of trusting to tradition or being influenced by prejudice or superstition.

THE article of Mr. R. Clifton Sturgis, in the June number of *The Cosmopolitan*, which has been mentioned several times in these columns, contains an interesting paragraph on the formal planting of home-grounds. When quite small places are in question, Mr. Sturgis is certainly right in pleading for a considerable measure of formality in their disposition. He says:

I know that there is a prevalent dislike to formality in gardening, and many good authorities point out, with some seeming show of reason, that we can never hope to attain more beautiful results than does Mother Nature herself, and that the nearer we approach her wild luxuriance the more beautiful our work will be. Now, while this may be true of the forest, the mountains and the great stretches of sea-coast dunes or inland prairies, it is not true if applied to the treatment of a comparatively small and necessarily formal piece of ground. I say necessarily formal, for the moment we put a house on the ground and arrange approaches we have made it formal, and if under these limitations we attempt, as is sometimes done, to avoid this formality, and seek to hide our approaches and make our house seem part of the rock on which it stands and as irregular in its plan and outlines as the rock, we get a forced effect which may possibly be picturesque, but which is not restful in any way and which has not the elements of a permanent home. If our piece of land is necessarily formalized when we place our house upon it, it is better in every way that the surroundings should show the restraining influence of man's hand and bear the impress of his thought; and, moreover, the grounds should show that they have been considered in connection with the house. Order is the real keynote of the small house and the small place. To accomplish this the house and the place must be studied together, and the owner or the architect should know something of the outdoor as well as the indoor needs, so as to give each its due consideration. . . . To this end formality of treatment is necessary, and if necessary we may be pretty sure that it may be and ought to be beautiful, as the fulfillment of need is true beauty.

Waste Planting in Illinois.

ALMOST all the groves planted in the prairie states have had for their object the protection of homesteads, and have, therefore, been placed without regard to the character of the soil in which they stand. They usually occupy rich fertile soil, and in this respect, as in others, they are not exponents of the best forestry practice, which would confine them to lands of least value for tillage. At Ridott, Illinois, Mr. Thomas Hunt has made a plantation of about ten acres of ridge land, a poor clayish soil from one to two feet deep, underlaid with laminated limestone, which is much broken by cross fractures. Mr. Hunt attempted to cultivate this land for a number of years, but finding it too poor for farm crops he planted trees upon it in 1873.

In one part of the grove European Larch was set in a mixture of hardwoods, including White Elm, Green Ash, Black Walnut, Box Elder and other species. In the remainder, rows of White and Scotch Pines, Norway Spruce, Arborvitæ and Larch were alternated with rows of Willow, Elm, Ash, Poplar, etc. In the winter of 1895 more than half the Larch were cut from the deciduous part of the grove, and averaged two good fence-posts a tree. The remaining stand of trees is only fair, and a considerable growth of weeds and grasses among them indicates the need of a denser leaf canopy. In the other part of the plantation, however, the conifers have almost shaded out the hardwoods, and their dense cover makes weed growth impossible. The Larches are the tallest, with the Pines and Spruces of about equal height, averaging thirty-five feet. White Cedar is somewhat oppressed by the others, but is making fair growth. Seventy White Pines, measured as they come, averaged six inches in diameter, breast-high, last spring. This represents an average width of annual

ring of about one-third of an inch; certainly a very satisfactory growth considering the site. Mr. Hunt has not only taken a large number of fence-posts from this otherwise useless land, but he has remaining a thick stand of timber that is constantly increasing in value, and which promises a yield fairly comparable to that of his more fertile acres.

Washington, D. C.

Charles A. Keffer.

A Botanical Journey through New Mexico.—I.

THE last day of July, 1895, found me at Las Cruces, the first station of importance on our way up the Rio Grande from El Paso. Las Cruces is a pleasant little city of four or five thousand inhabitants, of whom more than half are Mexicans. It is the seat of the Agricultural College of New Mexico. The valley of the Rio Grande here is wide and but little above the level of the river, which is treacherous and shifting, and often changes its course, as the old river-beds show. In the vicinity of the city irrigated agriculture is conducted on a more extended scale than it is at any other point in the territory. The conditions of soil and climate are especially adapted to the operations of gardening, and orchards and vineyards abound. Not only are the home wants of the people fully supplied, but also large quantities of vegetables and fruits are exported. Later, and during the early winter, as I went northward, I often saw as fine fruits as any country affords on the fruit-stands of the villages and cities. On asking the sellers whence the fruit came, the replies often were, "from Las Cruces, New Mexico."

Mexicans here do most of the farming. Some of their ways are exactly those of the days of Abraham. Oxen and donkeys tread out the grain, the men and women winnow it by throwing it with flat wooden shovels into the air. So they literally tread the wine-presses with their bare feet, while the purple juice bubbles up between their swarthy toes. They often, too, ferment their wine in leathern bottles. But not only are railways and telegraphs, telephones and electric-cars in New Mexico, but also such other civilizers as the reaper, the threshing-machine and the fanning-mill are already here, and in a few years these primitive methods of farming will only live in the memory of the oldest inhabitant.

A lofty range of mountains, whose numerous jagged points rising above the mountains proper have suggested to the people the name of "Organ Mountains," are in full sight from the city and not far away. Early in my stay Professor E. O. Wooten, of the Agricultural College, invited me to visit these mountains with him. We left the city just as the sun was rising, and a ride of about two hours carried us to the foot-hills of the range. It was an hour or more before we had made our way through a long, deep and wide cañon to the perpendicular wall of rock, a hundred or more feet high, over which poured a miniature stream, forming at its base a pool of bright, pure water, which afforded us drink and kept our melons cool.

Among the many trees growing in the mountains we saw the south-western Locust, *Robinia Neo-Mexicana*, a handsome small tree, and worthy of general cultivation for the beauty of its red flowers. It protects itself by larger and stouter spines than the eastern Yellow Locust needs, and its abundant fruit is thickly covered with bristly hairs. *Rosa Fendleri*, growing in a deep ravine near a spring, was near neighbor to the Locust, and a tall *Berberis*, a stranger, loaded with red fruit. It bears leaves different in form from those of *B. trifoliata*. I should have called it *B. Fendleri*, but Professor Coulter tells us that the berries of that species are blue.

In the cañon, up which we came to our camping-place, we found *Mullugo Cerviana*. It is a long way from Las Cruces to Llano Texas, where I saw it first and last, and exchanged congratulations. So it doubtless may be found at many stations between those places. Here *M. Cambesides* bears its relative company. This species once formed the genus *Glinus*. Its degradation, perhaps, was uncalled

for. Now that the change has been made its restoration to generic rank may not be advisable. Both species are so diminutive when growing among other plants that they may easily be overlooked. Later I found larger specimens of *M. Cerviana* growing commonly on the mesa between the city and "Little Mountain." Two handsome small species of *Phlox* grow abundantly on the mountain sides, while *Janusia* and other El Paso plants are not uncommon in the ravines.

I have met few localities where as many interesting and handsome Ferns may be found as these mountains afford. *Gymnogramme Ehrenbergiana* is not uncommon on shaded moist rocks. In company with it grew *Notholæna ferruginea*, *N. sinuata* and the peculiar *N. Hookeri*. Several species of *Pellæa*, including *P. Wrightiana*, abound. This species grows northward to Saline River and "Rock City" in Kansas, and eastward in that state to the bluffs of Marias de Cygne River, in Morris County, its most eastward reported station. We were in the mountains to find these and other Ferns in their best development, and we enlarged and enriched our collections with fine specimens of them.

Ipomœa incana, a widely distributed species in one of its many forms, is here; so are *Dalea formosa*, *Linum rigidum*, *Erigeron flagellaris*, *Dryopetalon runcinatum*, *Astericæfolius*, *Lesquerella purpurea*, *Solanum tuberosum*, var. *Krameria parviflora*, *Oxalis Vespertilionis*, *Clematis ligustrina*, *Heuchera rubescens*, *Perezia nana*, *Gaura parviflora*, which is almost everywhere; *G. coccinea*, also common; *Gossypianthus rigidiflorus*, taking its generic name from its cottony flowers; *Portulaca lanceolata*, *P. stellaria* and many common and rare plants.

As we rode home a full moon was shining on the banks of the irrigating ditches. The old river bed, the sand hills near the river, the elevated plains and "Little Mountain" each furnished additions to our botanical knowledge and collection of plants. *Oenothera Jamesii*, a lofty Evening Primrose, is abundant along the ditches. *O. coronapifolia* I saw in the sand hills; it extends far northward. *Maurandia Barclayana* and *Antirrhinum maurandioides* are ornamental climbing plants, and are often seen in cultivation; they are very dissimilar in habit, and it is strange that they should be confounded, as they often are.

Near the water several species of Willow grow. The whitened form of *Salix fluviatilis* is very common, and we shall see it as far north as we go. Along the bank of a ditch a grove of Ash-trees were loaded to bending with immense clusters of nearly ripe fruit, and this was a revelation to me. *Lepidium intermedium*, *Tribulus maximus* and rarely *T. grandiflorus* grow along the railway, while *Secuvium*, *Trianthema*, *Bigelovia Rusbyi*, *Helianthus ciliosa*, several *Chenopods* and *Amaranths* and species of *Atriplex* are abundant in alkaline soils. Near the river *Eclipta alba* grows, a queer, rayless and usually spreading composite; near it are *Equisetums*, a *Flaveria* and *Pluchea borealis*. *Dalea scoparia*, an exclusively western species, begins to appear in western Texas; it is on the sand hills near the river. We shall often see it as we go up the Rio Grande. It is a strong woody species, forming large clumps and often becoming four feet tall. *D. lanata* is a common western species, delighting to grow on river sand. It has followed the Red River through Texas and the Indian Territory to Arkansas. It is also common in Kansas from Medicine Lodge River, near where it leaves that state, westward to Colorado. Sometimes it spreads into broad patches three to four feet across. *D. fruticosa* is a very handsome species, to be seen from central Texas to Mexico and westward and northward to Colorado. It becomes a handsome bush or a miniature tree, and is well worthy of cultivation, as most of the species also are.

In the arid regions of central United States numerous species of *Artemesia*, Wormwood, make their home. They are not anthelmintics, but the officinal Wormwood of Europe and of old gardens in this country was supposed to be a mind strengthener and a curative for so-called mental diseases. All of the species are coarse, rayless, usually

shrubby, and sometimes viscid plants. They are generally known as Sage and Sage-brush. That common name, and the general lack of accurate botanical knowledge among the people, has led some persons to use the leaves of various species as seasoning for their sausages. Some of the species, too, are used in domestic practice as a remedy for colds and chills and fevers, and rarely infused as a table drink. In all of those ways the harmlessness, if not the efficacy, of the species is shown. *Artemesia filifolia*, which is common around the city, without plant egotism, may claim as much beauty as any of the species. A species of grouse, common in all the mountain region, is said to feed so much upon the buds and seeds of those plants as to render its flesh unpalatable from its bitterness. The birds are known as sage hens.

This rainy year has brought out the grasses of New Mexico in great profusion of species as well as of their individuals. The vigor of their growth is as great in proportion as the number of the individuals present. About a half dozen species of *Boutelona* are here; among them peculiar *B. eriopoda*. That it may be distinct from all other members of the genus, and always able to know itself, this species has developed a densely woolly band around its culm below each node, an effectual, but an odd, specific character for an uneducated grass to plan and make for itself.

Seiglingia (*Triodia*) *pulchella* is very abundant throughout all of this region. This year specimens of it are uncommonly large and fine. The handsomer *S. acuminata* is more rarely to be seen. This species has a wider range than has before been given to it. During my botanical rambles in Kansas I found it quite abundant over that state west of the ninety-ninth meridian—near Hays, Ellis County, Twin Mounds, Rooks County, in Cheyenne County and in the upper Arkansas valley so common as to give character to the vegetation there. *Panicum sanguinale* is almost everywhere. Here also are *P. lachnanthum*, *P. obtusum*, *P. colonum*, Buffalo Grass (*Bulbilis*), Bermuda Grass (*Capriola*), several species of *Chloris*, *Trichloris*, *Andropogon* and of other genera.

Las Cruces and the Organ Mountains are only a few miles distant from the Mexican border. They are also near the boundary of Texas. Botanizing in the vicinity of this city is, therefore, to become acquainted with the flora of northern Mexico and of extreme western Texas as well as to know the plants of southern New Mexico. Las Cruces is west of the one hundred and sixth meridian and also west of the north-south centre of the territory.

North Platte, Neb.

E. N. Plank.

Foreign Correspondence

London Letter.

LYCORIS SQUAMIGERA.—Plants of this Japanese *Amaryllid* are now flowering in the open air at Kew for the first time. They are established in a south border against a tropical fernery, conditions which suit the *Belladonna* Lily, and which are evidently suitable for the *Lycoris*. The scapes are from two to three feet high, solid, and bearing from six to eight flowers, which in size, form and general characters are very similar to those of the *Belladonna*, the most marked difference being in the minute stigma and bluish tinge of the *Lycoris*. Plants of *Amaryllis Belladonna*, var. *blanda*, are also in flower, this variety being about a month earlier than the type. The *Lycoris* is not a success as a pot-plant, but in a warm sunny border against a south wall it gives no trouble, growing freely, and every bulb pushing up a scape. If it were not for the difference in the seeds between *Lycoris* and *Amaryllis* one might doubt the wisdom of keeping the two genera separate. *L. squamigera* was distributed a few years ago under the name of *Amaryllis Hallii* (see vol. iii., p. 176, fig. 32, and vol. viii., p. 84).

ORNITHOGALUM REVOLUTUM.—This is one of the few species of *Ornithogalum* which deserve to rank as first-rate garden

bulbs. It belongs to the same section of the genus as *O. Arabicum* and *O. thyrsoides*, differing from them in having narrow leaves and slender scapes, while the flowers, though smaller, are at least as attractive in being numerous and prettily marked. The bulbs are about an inch in diameter, the leaves nine inches long and half an inch wide; scapes erect, a foot long each, bearing a subumbellate raceme of about twenty flowers, which are one and a half inch across, star-like, glistening white, the lower half covered with a blotch of deep olive-brown. The species is a native of south Africa, from whence it was introduced and cultivated in England nearly a century ago. It has lately been reintroduced from the Cape to Kew, where some potfuls of it are now flowering in a cool greenhouse.

GLADIOLUS PRIMULINUS.—When Mr. Baker described this species from a newly imported bulb six years ago it was much weaker than it is now. About a dozen spikes of flowers are now at their best in a sunny border, and in length, sturdiness and number of flowers they almost equal *Gladiolus dracocephalus* or *G. Quartinianus*; indeed, one might describe *G. primulinus* as a *G. Quartinianus* with yellow flowers. The scape is three feet long, and it bears about ten flowers arranged loosely on the upper third. The flowers are remarkable in having the top segment curved downward, completely hiding the inside of the tube and three lower segments, while the pair of upper lateral segments are broad and spread outward wing-like. When they first open the flowers are greenish yellow, afterward becoming primrose-yellow, with a few dust-like spots of red about the base of the segments. It is a promising garden plant.

CRINUM POWELLI.—Fine masses of the rose, rose-crimson and white-flowered forms of this hybrid *Crinum* are conspicuously in flower in sunny borders at Kew. A batch of seedlings obtained at Kew by crossing the white *C. Moorei* with *C. longifolium* (Capense) is now flowering for the first time, and while they are a shade paler in color than *C. Powellii* true and the flowers somewhat larger, they are not sufficiently distinct to be worth naming. The practical lesson this batch teaches is that in four years one may obtain a big batch of a beautiful hardy *Crinum* by crossing the common *C. longifolium* with the equally common *C. Moorei*.

LÆLIA LUCASIANA.—This distinct species was introduced three years ago by Messrs. F. Sander & Co., from Brazil, and named by Mr. Rolfe in compliment to Mr. C. J. Lucas, of Horsham, a well-known amateur collector of Orchids. Judging by its behavior so far under cultivation, it does not flower freely. It was exhibited in flower at a recent meeting of the Royal Horticultural Society, and a plant of it is now in flower at Kew, where a figure has been prepared for publication in *The Botanical Magazine*. It is a dwarf species, the fusiform pseudo-bulbs being about three inches long, the leaves, three to four inches, thick and fleshy, as in *Lælia Digbyana*, and the scape short, erect, two or three flowered, each flower two inches across, the segments equal and spreading, bright purplish-mauve, the lip channeled, recurved, very wavy and colored saffron-yellow, white near the tip. The Kew plant is kept in a moist tropical house while growing, and rested in the Cattleya house. Its nearest ally is *L. crispilabia*.

CYNORCHIS GRANDIFLORA.—When introduced from Madagascar three years ago it was feared that this terrestrial Orchid would prove difficult to keep. So far, however, it has behaved exceptionally well under the following treatment. After flowering, the plant is placed on a dry shelf in an intermediate temperature and allowed to rest until February. It is then shaken out, the tubers repotted—a mixture of peat and sphagnum—and placed in the tropical house on a shelf near the glass. When new growth pushes through the soil, water is given freely and the plant is kept well supplied until resting time comes round again. Under this treatment the plants have made healthy leaves over a foot long, and in July developed stout scapes as long as the leaves, each bearing one or two flowers one and a half

inches across, the large four-lobed moth-like rose-purple lip being their most attractive feature, the sepals and petals being smaller and colored green, with purple spots.

PHAJUS HUMBLOTTII.—Few cultivators can boast of having grown and flowered this plant several years in succession. The best-grown examples I have seen were in the nursery of L'Horticulture Internationale at Brussels, but these were recently imported plants. Mr. White, the clever Orchid grower in charge of Sir Trevor Lawrence's collection, while recording his own failure in the management of this plant, gives the following cultural directions for it which he had from an enthusiastic amateur who is successful in the cultivation of Madagascar Phajuses. I quote them from *The Gardeners' Chronicle*: After trials in various warm and intermediate temperatures, some few plants were placed in a shady position in the cool Odontoglossum house, where, under ordinary treatment as to watering, etc., they quickly regained health, producing good leaves and strong flower-spikes. He now considers it to be one of the easiest of Orchids to manage. The compost recommended for it is fibrous loam, leaf-soil and sphagnum in equal parts, with a liberal sprinkling of small crocks. Water sparingly till vigorous root action is evident, and then increase the supply. This Phajus is in flower now at Kew, but here it is grown in a tropical temperature, and consequently the leaves are much damaged by yellow thrips. The species was introduced about sixteen years ago by the French collector, Humblot, who discovered it in the interior of Madagascar at the same time as he discovered the beautiful *P. tuberosus*. Although *P. tuberosus* is difficult to manage, yet it has proved a most valuable plant in the breeders' hands, being one of the parents of several of the most beautiful of all Phajuses, hybrid or species.

HIBISCUS ARCHERI.—Four years ago the Rev. S. Archer, of Barbados, sent to Kew a number of seedling Hibiscuses which he had obtained by crossing varieties of the common *H. Rosa-sinensis* with the Zanzibarian *H. schizopetalus*. Most of the seedlings were wanting in distinguishing features except one, which proves to be a happy blending of the two parents. It has a loose scrambling habit, leaves intermediate in size, and flowers which in shape, laciniation of petals and long pendent stalks resemble *H. schizopetalus*. In size, however, they are about four times as large, and in color a rich crimson, equal to the color of the best variety of *H. Rosa-sinensis*. This beautiful hybrid is named in compliment to its raiser. In one of the houses at Kew there is a large bed filled with a selection of varieties of *H. Rosa-sinensis*, including double and single flowered, yellow, pink-purple, crimson and scarlet forms. They flower freely, being planted out in a bed of rich soil where they get plenty of sun and air.

London.

W. Watson.

New or Little-known Plants.

Clematis Addisonii.

THIS rare *Clematis*, which is closely related to the Leather-flower, *Clematis Viorna*, was confounded with another species by botanists until a few years ago, when its distinctive characters and history were made known by Professor Britton.* It is a vigorous, glabrous, tufted perennial with stout, erect or spreading purplish stems two or three feet in length. The lower leaves are simple or entire, or rarely two or three lobed, elliptic-oval, sessile and clasping by the broad base, deep blue-green above, glaucous below, from two to four inches in length, and much longer than the upper leaves, which bear stout tendrils on the back or ends of the midribs, and are pinnate, with from two to four ovate sessile leaflets, or rarely entire. The flowers are solitary and are borne on stout peduncles from two and a half to three inches in length and terminal, or terminal on short axillary branches; they are nodding,

* Britton, *Mem. Torrey Bot. Club*, II., 28, t. 3 (1890).

broadly ovate, conspicuously narrowed below the apex, three-quarters of an inch in length and one-half of an inch in width, with thick leathery sepals, dark violet-purple,

plumose dark brown styles from an inch to an inch and a quarter in length.

Clematis Addisonii inhabits the Alleghany Mountains



Fig. 43.—*Clematis Addisonii*.—See page 324.

except at the acute reflexed yellow tips, and numerous stamens about as long as the sepals. The fruits are flat, nearly orbicular, thick-margined and silky pubescent, with

from south-eastern Virginia, where it grows on the banks of the Roanoke River, near Roanoke, to Tennessee and Georgia, but does not appear to be anywhere very abun-

dant. Since 1890 it has been growing in Professor Sargent's garden in Brookline, Massachusetts, where it was sent in 1890 by our correspondent, Miss Anna Murray Vail, and where it has proved perfectly hardy and flowered freely every year during five or six weeks after the first of June. The illustration on page 325 of this issue is made from this cultivated plant.

Dr. Robinson has pointed out* that forms intermediate between *Clematis Addisonii* and *Clematis Viorna* occur. One of these intermediate forms is considered a hybrid by Dr. Britton. The bright flowers of *Clematis Addisonii* make it a good plant for the rock or wild garden, and, like its brighter-flowered relative, the Texan *Clematis coccinea*, it may prove valuable in the production of natural hybrids.

Cultural Department.

Roses.

THOUGH one may grow and experiment with all manner and species of plants, hardy and otherwise, the conclusion will generally be inevitable that the Roses stand preëminent as garden plants, and their flowers are the most acceptable at all times. Yet, though these plants are so generally loved that a garden is poor indeed which does not contain some specimens, it can scarcely be said that they are generally satisfactory plants in the garden of the careless cultivator, except possibly in the early summer, when the hardy varieties usually cultivated are at their best. At other times in such gardens they suffer neglect, crowding and starvation, with the inevitable result of defoliation by innumerable insect pests. Then, having invited these guests, we complain of their presence and condemn the plants rather than our own carelessness. Yet there are no plants more easily grown under comparatively simple conditions.

Probably, if more general attempts were made to grow the Teas and other continuously flowering kinds, more satisfaction would be found in actual results of flowers, and the plants would be apt to receive the required attention during the summer. Of course, during the dry, forcing weather of our ordinary summers the blooms will not mature slowly enough to gain large size or great substance, but even at the warmest time there will always be charming flowers in fair abundance from a collection of the Roses of this section. The choice must be somewhat a matter of experiment, as the different varieties will not do equally well everywhere. In my moderate experience the hybrid Tea, *La France*, is the first of ever-blooming Roses in abundance of flowers and perfect hardiness. One plant has grown in my garden fifteen years with no protection in winter. The climbing *La France* is as shy in flowering as the parent is prolific. Of other pink Roses, the Bridesmaid and Madame Testout are satisfactory in the open, and the old Bourbon, *Hermosa*, is still handsome enough for a place in the garden. For a pillar Rose it far exceeds the Climbing *Hermosa*, though its summer flowers are not too frequent. In fact, for this climate we have no continuous-flowered climber which is not usually cut to the ground in winter. The beautiful *Gloire de Dijon* is the nearest approach to such a desired variety, but its laterals seldom survive the winter, though otherwise it is perfectly hardy here.

It is not my intention to make a list of Roses, for there are endless varieties of Teas, and varying tastes, but there is one comparatively new variety, *Kaiserin Augusta Victoria*, which seems to me a great gain for the garden. This white flower is of fine form and great substance, and the plants are of the most sturdy habit. Lest it should be thought that I have some secret for the successful cultivation of Roses, it may be as well to explain that, according to my best knowledge, they require simply abundance of fresh air, best provided by comparative isolation (few plants suffer more from crowding), a comparatively stiff soil with some humus, of which cow-manure provides probably the most suitable, with abundance of bone-meal well worked into the bed on first making; and to make a satisfactory bed there should be two feet of this compost. Thirdly, there should be an adequate supply of water at all times, both to provide for growth and to deter insect pests. There is no better insecticide for a Rose-bush than a strong stream of water from a garden hose frequently applied. Of course, there are times when Nature brings on her destructive battalions in such force that one is compelled to employ harsher measures, but one year with another I do not find that

the insects in my garden get more than their small share of food. It seems much the fashion now to hunt insects with the microscope and many wonderful insecticides, but one can garden more comfortably and quite as satisfactorily in the old-fashioned way without them at most times.

Elizabeth, N. J.

J. N. Gerard.

Preparing for Winter Flowers.

IT is time now to prepare for winter-flowering bulbous plants.

The first to need attention are the *Lachenalias*. In general appearance these South African bulbs resemble Squills; the flower-stem, particularly, is like that of *Scilla campanulata*. The foliage is heavier and more or less mottled. We keep our bulbs in the soil in which they were grown last season, and although dry, on a shelf, the bulbs will start into growth if left much beyond this date. If they have done well there will be a large number of bulblets formed about the original bulb, which also remains good, and many of these will be large enough to bloom this season. Such as are undersized can be grown one year in boxes, and with good culture they will be large enough to bloom the following season. There are many species and varieties of *Lachenalias*. *L. tricolor* is the handsomest and the kind most commonly grown. Its varieties, *Nelsoni* and *Aurea gigantea*, are especially fine. While the flowers of *L. tricolor* are red, yellow and green, nicely blended, those of the last two named are nearly yellow, and practically so at the distance of a few feet, especially when massed, as they always should be. *L. lutea gigantea*, as its name implies, is a very strong-growing kind. When well grown its flower-stems exceed a foot in length, clothed nearly the whole of their length with beautiful pendent bells. *Lachenalias* are easily raised from seed, and if sown as soon as ripe the seeds will germinate in a few weeks, and bulbs will be formed large enough to bloom in a little more than a year.

The bulbs may be grown either in pots or pans, as convenience suggests. We find they do well planted at the rate of six bulbs to a six-inch pot. The soil should be rich and contain a fair admixture of leaf-soil and sand. The drainage must be free, as an abundance of water is needed during the growing season. It is not necessary to bring the pots into a cellar or to bury them, as is usually done with Dutch bulbs. An ordinary cold-frame will do well enough, and if shaded to some extent it will do better. In well-protected frames these African bulbs may be kept growing all winter, and I have known these and *Freessias* pass through two or three degrees of frost without injury when leafage was well advanced. As we need our plants for winter decoration they are kept in a genial temperature so as to have them in bloom about New Year's Day. This cultural treatment may be given to all African bulbs, or such as we find in gardens here.

Few people realize how many beautiful bulbous plants can be grown in the winter-time with very little fire-heat. In fact, forcing, as we understand it, is not at all congenial to a large number of bulbous plants so grown. Except the tender African bulbs here noted, all so-called Dutch bulbs are brought to the greatest perfection when grown in cold-frames and brought into heat only when well advanced.

Snowdrops, Dog-tooth Violets, Squills, species of *Hyacinthus*, Grape Hyacinths, *Fritillarias* and many Asiatic Tulips and Irises are never so interesting as when grown in pans in cold-frames. A large number of them are not well suited for outdoor planting in this country. The breaking up of our winters is too severe and prolonged. A fine day or two in early spring brings them into bloom only to be frost-bitten and miserably set back. When grown in frames they may be left undisturbed until early in February. The bulbs will have been growing all the winter, though but little of them is visible above the soil. When watered and aired on sunny days it is surprising how soon they will come into leaf and flower.

It is a mistake to suppose the moving of bulbous plants can be left until frosty weather. Nearly all hardy bulbs commence root-growth in August. There may be no visible upward growth, but when root-action takes place there must be important natural changes occurring within the sheaths of the bulbs. Potting and replanting should be done without delay. A long season of undergrowth is necessary, and, no doubt, the reason why store bulbs so often do poorly is because the time for this natural function has been delayed. On the 3d of August I moved some bulbs of Grape Hyacinths and found them started. Snowdrops, *Chionodoxas* and Squills were still dormant. To digress a little, these bulbs were raised from seed sown two years ago. They are all large enough to handle, and some will bloom next spring. The intention is to plant them in grass on a protected slope which is quite sunny

* Robinson, *Syn. Fl. N. Am.*, 1., pt. 1., 5.

until some scattered Oaks come into leaf. The bulbs, however, will have flowered and commenced going to rest before the Oaks are in full leaf.

Tender plants for greenhouse decoration during winter are making good growth. *Stevias* and *Bouvardias* are kept pinched in order to have them bushy. Superfluous eyes and root growths are cut away from tender *Hydrangeas*, and only such growth left as will be required to bloom next winter and spring. Some will be grown to four shoots and some only one. The heads produced in this way are immense, and if the plants are properly regulated with regard to height they will be fairly uniform. To have well-flowered plants next spring requires attention now, and the growth must be restricted, so that the wood which is made will properly ripen; in this way very little pruning will be necessary next spring.

Wellesley, Mass.

T. D. Hatfield.

Achimenes.

IN this neighborhood most of the varieties of *Achimenes* are useful summer plants, both for greenhouse decoration and for rock-work. It is somewhat strange to see *Achimenes* growing in company with *Silenes*, *Dianthus* and the like, but the list of hardy herbaceous and alpine plants suited for rock-work, and which survive our hot summers, is so small that we are driven to the necessity of utilizing plants from warmer countries. By the beginning of August the majority of hardy plants are out of bloom, and the *Achimenes* serve to brighten things up considerably. For use in the rockery the tubers are started as late as possible, say, about the beginning of May. We use five-inch pots, filling them with a compost consisting of leaf-soil, sand and old manure which has been passed through a half-inch sieve, to within an inch and a half of the rims. About ten of the tubers are placed at equal distances from each other over the surface, which is finished off with about three-quarters of an inch of finely sifted soil. Placed near the light they will in a few weeks be ready to take the places of plants in the rockery which are past for the season, such as *Pansies*, native *Violas*, at least those kinds which reproduce themselves freely from seed, the annual *Silenes*, *Delphiniums*, *Dianthus* and a host of others. I find it the best plan to plunge the pots, instead of planting them out, as in this way the tubers are easily lifted in the fall. All that is necessary is to lift the pots and store them in a warm dry place under the greenhouse bench. While they are out-of-doors they should, of course, never be allowed to suffer for want of water during dry spells. The tubers which are formed out-of-doors are much superior to those formed in the greenhouse, and it is advisable to use those grown outdoors for greenhouse work the following season, saving the previous season's greenhouse tubers for the rockery. By this method they increase very fast. In starting the plants for the greenhouse all that is needed is to cut away the old stems from the plants in the five-inch pots, scrape away a little of the surface soil, give them a thorough drenching and afterward a top-dressing of sandy soil, water with a fine rose and put them near the light in a warm house. As the plants need more pot room they should be potted in eight-inch seed-pans as the final shift, using the same mixture as already stated, with abundance of drainage. If the shoots grow too close together a few twigs placed among them, bending the outer ones toward the sides, will be found to answer well. A great deal of time may be spent in tying each shoot to small sticks; this is necessary if very symmetrical specimens are desired, but they look much more graceful when allowed to grow in a natural way. Those intended for indoor use can be started so as to have them in bloom almost at any season of the year. A great many varieties are in cultivation; the colors of the flowers are principally rose, white, orange, purple, crimson and scarlet. Those varieties with rose and purple flowers are the strongest-growing.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Some Novelties.—I.

NOT the least interesting portion of the year's work in the garden is the testing of the novelties offered by the dealers. Every season most of them have to be taken on trust from the great European growers, from whence many are derived, and others are of American origin, and it is satisfactory to note the increasing value of the latter over those of foreign origin, and as well as their better adaptation to our needs and that of the climate. It may be worth while to speak of some annual and perennial plants which have been tried here from various sources.

The Imperial Japanese Morning Glories are among the more

remarkable novelties of last year, and it is surprising that they have not been introduced from Japan before; there is wonderful variety among them, quite as much as promised, the foliage of many being beautifully mottled with white, and these when separated at planting-time and placed together make a very beautiful effect, not unlike the variegated *Hop* that came out with such a flourish a year or two ago and proved to be such a weed. I have heard complaints as to the germinating qualities of the seeds of these *Ipomœas*, and also that they did not grow so freely as might be desired; we found no trouble in getting the seeds to grow after carefully drawing a sharp knife round each and soaking them in water for a few hours, and planting a few at a time as fast as they became distended with moisture; if they did not swell we used the knife again, and the young plants were above the soil in a very few hours after planting. We did find that the plants grew slowly in pots, and no progress was made until they were set out in warm weather, and I fancy it would save time and trouble another year to keep the seeds until the end of May, soak and sow out-of-doors where they are to remain. We have set them round bean poles in the border, and these are already clothed to the top and flowers are coming rapidly of exquisite colors, some having the appearance of being double, owing to the way they are ruffled.

Madame Gunther's Hybrid *Nasturtiums* are being treated similarly as to poles, and it is surprising how beautiful an object is a group of climbing *Nasturtiums* when they have a chance to climb. The flowers are shown off to the best advantage, the plants do not overrun other things in the border, and as this strain is really a fine one, the effect is pleasing and promises to last until severe frosts put an end to this display.

The Sweet Pea *Cupid*, to say the least, has enjoyed a good entrance into garden life, and is also all that has been claimed in advance, but I fail to see in it any practical value as compared with others that are tall. Its stems are so short as to be of no value when cut, and there are many better plants of dwarf habit that seem to be more useful than *Cupid*, even if one could get the seeds to grow freely. There seems to be either a constitutional weakness about white-flowered Pea seeds, or something more difficult to explain. Seeds of *Emily Henderson* germinated very poorly under exactly the same conditions as the others that came as well as could be desired. Possibly when the stock grown is larger we shall get more of them to grow. It is singular that this same dwarf Pea should have occurred also in two different parts of Europe as well as in California. *Blanche Ferry* is a kind much in favor, and we have for years saved our own seeds of it; we think ours must be specially good, for they came into flower sooner and are really better than the *Blanche Ferry Improved*, tried this year for the first time. *Katherine Tracy*, we believe of the same origin as the last, is altogether one of the best. It must be a selection from *Blanche Ferry*, for we have seen it so grown by a florist in this state who found the beautiful shade of clear pink the same color as the *Daybreak Carnation*, very much appreciated in the Boston market, and he grew a quantity of it last winter in the greenhouse, but he had not quite got it fixed, and there was still a tendency to sport, none of which is apparent in *Katherine Tracy* as we have it now. The season has been very favorable for Sweet Peas; no watering was necessary, owing to the frequent showers, and they are better than we remember to have seen them.

We shall soon have as many varieties of *Zinnia* as of *Asters*; each year adds to the number, and all have merit, for, considering their utility and easy culture, there is nothing to equal them; there are tall ones and dwarf, and now we have the *Lilliput* to use as a front row of all, and of the three I rather think that the little ones will be most liked for cutting when better known. There is a refinement and finish about these little gems that all others lack, and the colors, too, are good and well defined. In a long border devoted to annuals the three kinds of *Zinnia* are a distinct success. Hitherto it has been difficult to get an annual that would tone down from the dwarf *Zinnia* to the plants used for a margin.

Campanula Japonica was a surprise when seen in the seed-lists. We had no knowledge of Japanese *Campanulas*, and our knowledge has not been increased in this direction, for we were led to expect great things of a perennial *Campanula* that flowered the first year from seed, the flowers being of an intense glossy blue, semidouble, and produced in great profusion. All of this has proved true except the name, which should have been *Platycodon Mariesii*, and we should then not have purchased the seeds.

Another name, *Coreopsis Japonica*, had a rather interesting look in the seed-list. I had an idea that this genus was a purely North American one, and no authority that we have

access to tells to the contrary, but here was a new bushy variety with large canary-yellow flowers produced from June till frost. If we except the name, all of the rest promises to come true, but I doubt if it is a *Coreopsis*. It has much greater affinity with the *Heleniums*, so far as I can gather from Gray's scholarly work on the North American Compositæ.—[See page 316 of our last number.—Ed.]

South Lancaster, Mass.

E. O. Orpet.

Correspondence.

An Interesting Sport.

To the Editor of GARDEN AND FOREST:

Sir,—While passing through one of our principal Rose nurseries lately I saw in a row of the Augustine Guinoisseau (white La France) variety where a shoot the size of one's finger had sprung up this season to the height of nearly three feet, and there parted into four or five umbel-like branches. On one of these was a well-developed flower of the true type and on another an equally well-developed flower of La France. I have seen a good many sports, but I believe none so well defined as this in its primal condition. This, perhaps, may be accounted for in the fact that Augustine Guinoisseau is itself a sport from La France, and here it is sporting back to the original sort. An effort will be made to propagate from both the shoot and the stem on which the sport appeared, and the result will be watched with much interest. Possibly we may sometime know the reason for the production of these sports, but it is certain we do not now. In the mean time we can be thankful that Nature by this peculiar diversion has given us some of her choicest benefactions.

Fruitvale, Calif.

H. G. Pratt.

From the Missouri Botanic Garden.

To the Editor of GARDEN AND FOREST:

Sir,—The loss at the garden from the cyclone was not as serious as its friends feared, and since the removal of the wreck one unfamiliar with the grounds might not note the vacancies. The pile of cord-wood down beyond the arboretum is eloquent, however, to those who know its history; for, after burning the roots and waste branches, there remains about 100 cords of fire-wood, representing 450 trees of large or fair size that were either uprooted, broken off, or so badly mutilated as to be useless. Trees of tender or light root-growth were torn from the ground, but by far the greater part were snapped off at from five to six feet above the ground. A few were broken off higher up, as, for instance, a splendid White Pine at least sixty feet high (the best in the grounds) that stood in the enclosure surrounding the old Shaw residence. It was snapped off at about ten feet from the ground.

The trunks were not twisted, and it is believed that the damage done at this point was not due to the rotary motion of the storm, but to the fierce gale that accompanied and followed it. The moving storm-cloud seems to have come closer to earth farther along on its course to the north-east, its main fury being apparently reserved for the high ground around Lafayette Park. The chief loss at the garden is among trees. Catalpa and Osage Orange trees were practically exterminated. The loss of the Catalpas is keenly felt by the garden authorities, as there were some remarkably fine and large specimens among them, several with trunks more than two feet in diameter. Other trees whose loss is greatly deplored are two or three of the best and largest specimens of *Tilia heterophylla* in cultivation; two of the best-grown and largest-known specimens of *Rhamnus catharticus*, symmetrical round-topped trees, from fifteen to twenty feet high, and with trunks eight to ten inches in diameter. These were said by Mr. Nicholson, of Kew, when he visited the garden a few years ago, to be the largest he had ever seen. A Kentucky Coffee-tree, while not so large (forty feet high), was particularly shapely and well grown, and is greatly missed. Other noteworthy losses are a picturesque English Hawthorn, about fifteen feet in height, that was a noticeable feature of the Shaw dwelling-house grounds; a fine Corsican Pine that stood near the main entrance to the garden; the largest specimens of *Magnolia Fraseri* and Copper Beech on the grounds; and a number of Tulip-trees, including a good one near the house and one in the arboretum that Professor Trelease especially regrets as being a tree that Mr. Shaw took pride in and pointed out to the Professor as the tallest tree in the grounds when he assumed the directorship of the garden some twelve years ago. The tree was then 100 feet high.

Neither time nor money can replace such features, but the

loss that can be represented by figures reaches four thousand dollars. This only covers the expense of removing debris and repairing walks, fences and buildings. The damage to buildings comprises the loss of the skylight of the Linnæan house, the roof of one wing of the Gate house, part of the roof of the herbarium and the demolition of an old stable. Iron and other fences were injured in various parts of the grounds, some shrubs were ruined, and walks and beds were wrecked, but the feeling is that things might have been much worse. This feeling is strengthened by the fact that a part of the unimproved ground is shortly to be reclaimed.

Before the storm Messrs. Olmsted, Olmsted & Elliott had been engaged to design the landscape work in the new part, and in addition to plan for changes to be gradually made in the old grounds, to bring them into harmony with the new. The thinning out done by the tornado, or in consequence of its mutilation, will result in greatly simplifying and hastening the alterations in the old grounds, and increases the opportunities for bringing them rapidly into relation with the landscape effects of the newly improved section.

Brighton, Ill.

Fanny Copley Seavey.

The Water-garden at Willow Grove.

To the Editor of GARDEN AND FOREST:

Sir,—No pleasure-ground is considered at the present time complete without a water-garden, and the new park at Willow Grove, fifteen miles from Philadelphia, on the Old York Road, has this year included one in its attractions. The sheet of water planted has pleasing shore lines, and it is spanned by a graceful bridge at its narrowest part, the bridge being built of red stone and covered by the Japanese *Ampelopsis*. The piece of ground lying between the two main divisions of water is planted with hardy Grasses, Bamboos and other sub-tropical plants, including a large specimen of *Livistonia*. Near the shores are some effective flower-beds, although the scarlet blaze of a great mass of *Geraniums* at one point is too near the soft colors of the Water-lilies, which are now in bloom. The water-garden is some five hundred feet long and averages fifty feet wide, and here are planted, in groups, a large variety of the hardy and tender *Nymphæas* and *Nelumbiums*. The hardy sorts were set out the last of April, and a number of flowers opened in June. On the 28th of June the first flower of Egyptian Lotus appeared, and early in July there was a profusion of these flowers and the plants were making luxuriant growth. The tender *Nymphæas* were planted the latter part of May and some produced flowers the first week in July. Until last October the site of the park was a farm in a high state of cultivation, the natural soil being loam, with a tenacious clayey subsoil. In the construction of this section of the park much grading was necessary. The top spit was valuable and was utilized, after the grading was completed, as a top soil for planting shrubbery, bedding-plants, etc. It also afforded excellent soil for planting the aquatics. The soil in the water-garden was excavated to the depth of three feet; afterward from fifteen to eighteen inches of the top soil was placed in the bottom. The outline of the pond is laid in masonry and is kept below the ground-level, which slopes gently to the edge, and the sod covers the masonry. Besides this pond there is also a Victoria pond, fifty by sixty feet, which is heated by steam from the adjacent power-house.

The Egyptian Lotus is succeeding well. It bears transplanting under proper conditions, but must not be set out too early. Natural conditions and suitable locality should be provided, and the tubers should show signs of starting. Among the early-flowering *Nymphæas* those of the *Odorata* type are noticeable. A clump of variety *Rosea* fifty feet across is a charming sight, as is also a mass of *Sulphurea*, the exquisite yellow flowers lifted above the water on erect stalks. The southern variety, *Gigantea*, is superb. If this is started in pots the flowers, as well as the leaves, will be larger and stronger when the plants are established. All the hybrids of the European species, *N. alba*, are strong robust growers and free and continuous in flowering until frost, and they are doing well here. *N. alba candidissima* and *N. albida* are among the best white flowers; *N. carnea* is a soft pink; *Marliac's Rosea* is the choice of the hardy red ones, and *N. chromatella* is well known as a rich yellow. These are all well represented, as are also a number of the tender *Nymphæas*, embracing all the colors from pure white, pink, red, crimson, blue, purple and yellow.

Altogether this new garden well shows the advance in cultivating aquatic plants. Fortunately, those who desire to visit it will find themselves traversing the most interesting trolley-road that leads out of Philadelphia, winding through delightful scenery, by rich fields, luxuriant pastures and wooded hills.

The rural beauty of the undulating verdurous landscape is undisturbed by suburban "improvements" of any kind, and many of the dwellings are the solidly built, picturesque stone farm-houses of a century ago, now the homes of wealthy citizens. Perhaps, nowhere near a large city in the east can a more satisfying trolley ride be enjoyed. The park itself is planted with taste. The wide walks and avenues follow graceful lines, and groups of flowering shrubs and trees and well-kept turf are established. An avenue of Pin Oak-trees will in time make a striking feature, and stretching away on either side are the beautiful Cheltenham Hills.

Riverton, N. J.

W. Tricker.

The Forest.

The Burma Teak Forests.—II.

FIRST EXPLORATION OF THE FORESTS.

EARLY in February I set out on my first tour into the forests, from which I did not return until late in May, at the commencement of the rains. The province of Pegu, as then constituted, comprised the valleys of two rivers running parallel from north to south. I went up the Sitang valley as far as the town of Toungoo, and after crossing the hills which separate these valleys, returned by the larger of the two valleys, that of the Irauddi River. The Teak-producing forests are on the hills on either side of these rivers, and I explored these hills, as far as time permitted, in different directions. I have said that the Teak-tree forms a small proportion of the forest. Its companions are Bamboos and a large variety of other trees, at that time none of them possessing any market value. That was forty years ago when the country was thinly inhabited. Now, with a population of three millions, with a number of large and wealthy towns, several kinds besides Teak are used for building and other purposes, and the trade in Bamboos has become considerable. But so large is the forest area that the open country in both valleys is readily supplied from the outskirts. From the remoter forest tracts it does not yet pay to bring away anything but Teak. The other kinds, with few exceptions, are without value now as they were forty years ago. With admiration I beheld the magnificent stems of *Terminalia*, *Anogeinus*, *Lagerstroemia* and other trees, with clean cylindrical boles branchless to a great height; most of these trees with beautiful dark-colored heart-wood. These trunks would yield huge beams and magnificent planking, and I found it difficult to understand that Teak should be the only marketable timber. When I asked my Burmese companions to explain, they laughed and pointed to a large *Terminalia* which the storm had blown down. A magnificent piece of timber nearly 100 feet long, the heart-wood dark purple, beautifully mottled, as if made to furnish the most elegant furniture. "Next year, should the master come here, he will find this tree a long heap of brown mold, unless, indeed, the jungle fires should have destroyed it." And this saying of theirs was afterward invariably confirmed by my own experience. It is chiefly the durability of Teak timber in a tropical climate which gives it the high market value it possesses. Teak has other valuable qualities besides durability. Among timbers it holds the place which the diamond maintains among precious stones and gold among metals. There are a few other trees in Burma with heart-wood as durable as that of Teak, but the wood of these kinds is so hard and heavy that they can only be worked with difficulty, and the timber cannot be floated. Teak is easily worked, does not warp or split, takes a beautiful polish, and, if properly treated, floats without difficulty.

EARLY WORKING PLANS.

To establish a regular system in a forest of that description, where Teak was the only marketable tree, obviously was a singularly difficult, nay, at first sight, an impossible task. Each Teak-tree cut would make room for valueless trees of other kinds, while less seed would be shed and consequently fewer Teak seedlings would spring up. Under these circumstances one plan only was feasible—to cut sparingly, to select the trees to be cut with the greatest care, and simultaneously to increase the proportion of Teak in the forest by planting. These essential points I kept in view from the very beginning, though, as regards planting, it was not possible to take action upon a sufficiently large scale, until several years later.

Cuttings, however, had to be made in order to produce money. I knew perfectly well that unless the forests could be made a source of annual net revenue to the Government, regular forest management was not likely to be maintained. These cuttings, however, I was determined should be regu-

lated by a well-considered plan, the object of which would be the maintenance and not the exhaustion of the forests. In order to prepare such a plan it was necessary to know the rate of growth of the Teak-tree, the quantity of growing timber in the forests, and the proportion of the different age classes in each district. In 1856 very little was known regarding the rate of growth of Teak. The timber of that tree has well-defined concentric rings, marked like the annual rings of Oak, Ash and other kinds, by a belt of numerous large pores. Subsequent researches have proved that these concentric rings actually represent a year's growth, the dry season being the period of rest corresponding to the winter of temperate climates. In 1856, however, this had not been fully established. Fortunately there were at the Botanic Gardens in Calcutta and in gardens elsewhere Teak-trees the age of which was known. These I measured, and these data, together with what was known regarding the rate of growth of the Teak-tree in Bombay and on the island of Java, enabled me to form a preliminary though very imperfect idea regarding the rate of growth of this tree.

The growing stock of timber and the proportion of the different age classes constituting this growing stock, would ordinarily be determined by the examination of numerous sample areas, carefully selected, so as to represent the different types of forest. This plan, I soon found, was out of the question. The hilly country, where the Teak-producing tracts were chiefly found, was of enormous extent, several thousand square miles, stocked with forests extremely variable in their character. Large areas of forest without Teak intervened between the Teak-producing tracts, and in these the proportion of Teak varied extremely. No topographical survey of the country had been made and no maps existed to guide me in determining the area of the Teak-producing forests. The only guide I had in that respect at that time, and during the greater part of my service in Burma, were rough sketch maps of the forests, based upon route surveys with prismatic compass and chain, which I prepared while exploring the forests with the aid of native assistants whom I had trained for this work. Yet it was necessary, within the short time I had at my disposal before the rains set in, about three months and a half, to collect sufficient data to enable me to frame a preliminary working plan. Hence I set to work and took in hand successively each forest district which lay near the route which I had fixed upon. Each district was traversed in different directions, and on my march I counted all Teak-trees seen within a certain distance on either side of the track pursued. In forming forest districts I was guided by geographical features and the configuration of the ground. The hills which separate the two main rivers are drained by numerous smaller streams, which eventually join either the Sitang or the Irauddi River. The catchment area of one of these streams was, as a rule, assigned to one forest district. It took me some time to select, among my Burmese followers, a staff of competent men to assist me in these valuation surveys. When I had organized matters and had myself made sufficient progress in the Burmese language to enable me to carry on my exploration work in the forest without an interpreter, for the interpreter I had brought from Rangoon could not stand the hard work in the tropical heat of the Burma forests, I had already examined several districts, so that I had formed a general idea regarding the character of the forests before I commenced my valuation surveys. In the five districts which remained an area aggregating 3,840 acres was surveyed, and on this area were found 2,423 Teak-trees of the first and 2,503 trees of the second class. It should here be mentioned that in Burma the lumbermen had always been in the habit of measuring the trees by girth, and not by diameter, and this practice I adopted without hesitation, though the results are less accurate than those obtained by diameter measurement. The unit of measure among Burmans at that time was not the foot, but the cubit. This also I adopted, and accepted it as equivalent to eighteen inches. The first question which presented itself to me was to select a minimum size, below which no tree should, as a rule, be felled, and this I fixed at four cubits, or six feet, in girth. Hence all trees above that size were termed first-class, while second-class trees were those between three and four cubits, or between four feet six inches and six feet, in girth. The data which I had collected regarding the rate of growth of the Teak-tree led me to the conclusion that the mean age of trees in girth three cubits, or four feet six inches, was thirty-nine years, and that of trees four cubits, or six feet, in girth was sixty-two years. Hence the conclusion seemed justified that the smallest trees of the second class would attain first-class size within a period of twenty-three years. Later researches have shown that these results were too favorable, and that in the present condition of

the forests the growth is much less rapid than what was assumed in 1856.

Bonn, Germany.

Dietrich Brandis.

Notes.

According to the *Pacific Rural Press*, another car-load of redwood has just been shipped from California to Nuremberg, Germany, for making lead-pencils, which is another indication that the Cedar forests of Europe, which formerly supplied wood for this purpose, are nearly exhausted.

The beauty and fragrance of the Sweet Peas make them such general favorites that the Everlasting or Perennial species, *Lathyrus latifolius*, is too often overlooked. The white variety is especially desirable at this season. The flowers are borne on long-stemmed racemes, and, although they have no odor, they are unsurpassed in the purity of their color.

Evaporated apples of the crop of 1896 are already in market, and stock left over from last year is less in demand as the season advances. Dried huckleberries of this season are offered at eight cents a pound by the wholesale dealers, raspberries at fifteen cents, and new southern dried cherries at ten cents a pound in large quantities. Royal apricots, from California, are also here, and cost nine cents a pound.

Potatoes have been coming into the wholesale markets of this city in more than adequate supply and prices have suffered correspondingly, so that seventy-five cents a barrel was an average price last week. Sweet potatoes also are being handled without profit to the grower. Prices declined steadily last week from \$1.75 and \$2.00 a barrel on Monday until on Friday, when the highest-grade yellow sweet potatoes, from New Jersey, in large barrels, brought as little as \$1.00, and red sweet potatoes, from North Carolina, commanded but fifty to sixty-five cents a barrel.

Plants which have spines and other contrivances for protecting themselves are often used by defenceless plants as shelters. Professor Kerner notes that certain wild Vetches and umbelliferous plants, which would furnish good fodder for grazing animals, are regularly found in the prickly hedges along the roads and under spiny bushes, which form a belt around forests. These bushes not only defend their own foliage, but also the delicate plants which have been established under their protection. This is no partnership or symbiosis, however, for the advantage is all on the side of the plants protected. The armed bushes receive no profit or return from the plants they defend, and they do not protect them intentionally.

A correspondent writing of Mrs. Shepherd's garden at Buenaventura, California, says that she grows two crops of seed from *Cosmos* every year on the same ground. Seeds of the new strain when sown early follow the customs of California annuals and become more dwarf, while they seem to hurry into bloom earlier every year. New shades of color are said to be coming into the flowers and modifications of habit in various ways, so that a field of the new early *Cosmos* in full bloom is a beautiful sight. No doubt, this is all true, but so far the new strains as grown here cannot compare with the older kinds in grace of form, although they may equal them in richness of color. A first-rate strain of early-flowering *Cosmos* would be a boon to eastern gardens, for the plants here are always cut down by frost while at the height of their bloom.

Mr. Joseph Meehan, in a late number of *The Country Gentleman*, gives an account of his way of planting conifers in August. The hole to receive the tree having been dug beforehand, the tree is lifted and placed in its new position and soil is filled in until the ball is about covered. Water is then given in abundance, and it may be stirred about with a stick until it is of the consistency of mush and will settle closely about the roots. No tramping is required, but after soil and water have settled, say in four or five hours, the remaining soil needed is filled in and a mulch is put about the roots. Of course, all conifers do not transplant well at this season, most of the Pines which have not many fibrous roots being exceptions. The reason why this is a safe season for planting is that the soil is warm like that in a propagating-bench, and when the roots are kept moist the tree will throw out new roots like a cutting. If the trees are more than six feet high the tops should be sprinkled with water for a few nights to check too rapid transpiration, until they have become thoroughly established.

Professor F. A. Waugh has lately prepared for the Vermont Experiment Station a bulletin on the pollination of Plums, a matter which has been the subject of much investigation during recent years. It is well known that Plums are uncertain about setting fruit, and a part of this uncertainty seems due to the fact that the blossoms do not fertilize themselves. Professor Waugh explains how cross-pollination is provided for by the defectiveness of the flower parts and by other natural adaptations. There is a general agreement among horticulturists and botanists that cross-fertilization is desirable, and it seems that since the American varieties of cultivated Plums have been derived from several distinct species they can best be made fruitful by crossing with varieties that are closely related to each other botanically. The bulletin is instructively illustrated, and in addition to Professor Waugh's own observations it contains the quoted opinions of many eminent horticulturists. We have acquired considerable knowledge as to the pollination of Plums, but there are many questions of practical bearing and theoretical interest that invite investigation. The hope is expressed that this bulletin will direct attention to some of these unanswered questions and encourage others to make observations in this line. The bulletin closes by suggesting several subjects for inquiry, and many more will occur to the investigator who takes hold of the subject in earnest.

The importations of lemons during July in this city amounted to 222,975 boxes, 235,600 boxes having been received last year in the same month, and 358,350 during the same term in 1894. Prices have advanced rapidly with the hot weather. Last Friday the cargo of the steamship *Karamania* realized \$1.12½ to \$4.75 a box for Palermo lemons, while the Sorrento fruit brought \$3.25 to \$5.62½, and Majori lemons commanded \$3.50 to \$6.12½. At the same sale Rodi and Sorrento oranges brought \$2.62½ to \$5.12½ a box. During July 387,680 bunches of bananas came into this port, against 535,475 bunches received in the same month in 1895. The supply of cocoanuts has been very large, 827,800 bags having been received here last month, while but 194,000 bags constituted the supply in July, 1895. Seventy-five car-loads of California fruits were sold here during last week. Owing to the large quantity received and the intensely hot weather prices declined steadily, and Bartlett pears sold for \$1.10 to \$1.50 a box. At these prices nothing whatever is returned to the grower, since the cost for freight alone is something more than \$1.00 a box, besides expenses for commissions, boxes, paper, nails, packing, etc. California peaches are of good size and color, and some of the best ever seen in eastern markets, as the Decker, are now coming from that state. Owing to the heavy receipts of this fruit from Delaware and other near-by states, prices have been low, and Crawfords from the Pacific coast sold last week for fifty-five to eighty cents, exceptionally fine lots bringing \$1.00 a box. Plums and prunes are offered in large variety and moderate quantity, prices ranging from \$1.10 to \$1.50 a box at wholesale.

Last year the English papers made protest against the robbing of country lanes and woods of Ferns, to be sold in the cities, and just now they are raising what seems to be a justifiable cry of alarm against the spoliation of all kinds of greenery which beautify the country landscape. *The Gardeners' Magazine*, for instance, declares that the heaths and open places about London are rapidly being stripped of everything green except grass and such well-armed plants as Brambles which can protect themselves against the dwellers of the town, who, on their incursions into the country, tear to pieces and carry away everything green unless it is defended by thorns. Of course, it is natural that the residents of towns should admire things green, and the desire may be natural to deck their homes with souvenirs of their rural outings. But as the excursionists increase in number with improved facilities for travel, the indulgence of this desire means the annihilation of the vegetation concerned. These people should be taught to confine their admiration to the plants and flowers when growing in beauty in their native habitats, instead of carrying their dragged fragments home until they are quite exterminated. Any one who has noticed the trolley cars and excursion trains on their return to this city must have observed how large a proportion of these excursionists carry armfuls of wilted Ferns, branches of shrubs and herbaceous plants. Of course, these fragments of vegetation will have no beauty by the time they reach their destination. Their native haunts are left desolate for the time, and since no vegetation can endure such plucking year after year many of the beautiful plants within picnic distance of the city will be practically exterminated, unless some measures are taken to protect them.

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The Preservation of Natural Beauty.

IT is now more than five years since the body known as the Trustees of Public Reservation was incorporated under an act of the Legislature of Massachusetts, for the purpose of preserving tracts of land which were distinguished for their natural beauty or for their historic association. This was the first organization of the kind ever established, so far as we know, and it seemed to us then, as it does yet, a proof of more than ordinary enlightenment and public spirit in the society out of which it grew. We expressed the hope then that this might become a settled policy throughout the country, for it certainly is not too much to expect that a community of civilized people would take upon themselves the duty of preserving and transmitting to their children the treasures of beauty which they have inherited, or of protecting from defacement and ruin places made memorable by patriotic sacrifices and noble deeds and preserving them for the inspiration of their descendants. New York has enacted a similar law, and steps have been taken for saving some of our revolutionary battle-fields and other noteworthy places from desecration. The movement for saving the Palisades in New Jersey is the outcome of a similar sentiment, and so is the rescue and devotion to public use of that magnificent river gorge known as the Dalles of the St. Croix, between the states of Minnesota and Wisconsin. The acquisition of Niagara by the state of New York and of Valley Forge by Pennsylvania are noteworthy results of the same feeling.

It was the example of Massachusetts which suggested an article in *The Spectator*, of London, in which it was sharply pointed out that it was quite as important for a nation to secure sites of great natural beauty as it was to buy fine pictures. And since Snowdon had already been in the market, and the waterfall of Lodore was advertised for sale, it was urged that a national trust for places of historic interest or natural beauty was a necessity. Such a trust was therefore organized, and the trustees were made up of men eminent in letters and in public life. In a recent number of *The Spectator*, Miss Octavia Hill, who was one of the original incorporators of the trust, writes that the wild heathy promontory known as Barras Head, one of the

headlands which enclose King Arthur's Cove at Tintagel, could be secured for a comparatively small sum; and, no doubt, there are enough people interested in the Arthurian legends and the poetry that has gathered about them, to rescue this delightful spot and dedicate it to public use forever. In the same letter it is stated that a lovely bit of old English architecture, a clergy-house built before the Reformation, in a Sussex village, had been acquired as an inheritance from the middle ages. It is encouraging to see good work like that in Massachusetts bearing fruit across the sea, and we are sure that men and women of public spirit, who urge a policy of this sort upon the General Government and the government of the separate states, will minister to some of the noblest and purest emotions that animate the human soul, while they will accomplish a work which is eminently practical, even from the sordid dollar-and-cent point of view, and add a distinct pecuniary value to all property which surrounds these places.

The setting apart of the great forest reservations of the west by the General Government is, of course, a different matter. But the establishment of Yellowstone Park and the acquisition of the great battle-fields of the Rebellion are justified only by a sentiment that the places which are remarkable for the sublimity and beauty of their natural features, or which have been consecrated by heroic struggles for principle, are, or ought to be, possessions of the people as a whole. But if the people, speaking through their representatives, have asserted their rights in such conspicuous instances, they certainly must feel that their unwritten rights are often invaded by private persons and corporations when they find the scenery which they have enjoyed all their lives needlessly defaced. In some cases laws have been enacted to protect them in this matter. In this city the obtrusive ugliness of signs and advertisements within a certain distance from park territory can be mitigated by the action of the Park Board, but all over the country, landscapes are blotted out by billboards and made hideous by the paint pot of the advertiser, and there is no redress against the outrage. If a private citizen is willing to devote his property to such use he can violate the sensibilities of his neighbors and of all who travel on the highway with impunity. Since there is law against offensive smells and useless noises, there seems to be no injustice in compelling property owners to respect that love for beauty which, to some degree, is implanted in the nature of every one. A loathsome sight is certainly as disagreeable as a foul smell.

What is needed primarily is not, however, law, but a sensitive public conscience which will impel every citizen to respect the feelings of his neighbors. In a truly enlightened community a corporation which was building a railroad would not needlessly gash and scar the landscape. They would no sooner think of destroying the beauties which are the inheritance of all than they would of recklessly destroying property, for which they would be held in pecuniary damages. We can remember a White Oak-tree which had stood beside an old highway in New Jersey for generations. It was a stately tree before the war of the Revolution. It was an essential feature in a beautiful prospect, and it had been admired and revered by thousands who traveled on that road until they felt a personal interest and proprietorship in it. One day the owner of the abutting land cut down this tree for apparently no reason whatever, for it did no injury to the land, and the log was left to rot by the wayside, but every one who has passed the stump since that day feels a sense of bereavement. A noteworthy landmark of the country is obliterated. The whole place is distinctly less interesting, and will be forever.

The sum of the whole matter is that while the established boards of trustees for acquiring public reservations mark an advance in public sentiment, and while these organizations are already doing a noble work and deserve the fullest sympathy and most substantial aid, what we

need still more is a wider appreciation of and love for natural beauty. The people who take a genuine delight in natural scenery and are conscious of its soothing influence are not likely to deface or destroy it. Besides this they can realize that others have rights in the general beauty of the land in which they live, and they can be persuaded to respect those rights. Neither you nor I may have a legal property right in Niagara or the field of Gettysburg, but every American would feel that he was robbed of something to which he had a moral right if either of these places were turned over to sordid use. The sublimity, the poetry, the inspiration of places like these are a common heritage. These influences should be guarded as jealously as any other common right.

UNDER the title of "The Coming Fruit," Dr. D. Morris, of Kew, not long since wrote a letter to *The Saturday Review*, urging upon the people of the West India Islands to establish groves of Grape-fruit trees of the best quality. When passing through New York in the early part of this year, Dr. Morris was very strongly impressed by the quantity of this fruit which the New York market was demanding, and our readers will, perhaps, remember an article in the present volume of GARDEN AND FOREST, on page 163, in which he gives a sketch of the origin and history of the Shaddock, Pomelo, Grape-fruit, Forbidden-fruit and other varieties which belong to this group of Citrus fruits, and are botanically classified under the species *Citrus decumana*. They are quite distinct botanically from true Oranges, Citrons or other groups of the Orange family, and since they have mostly been raised from seed with little care given to selection, they vary widely in quality. The frost which ruined the Orange groves of Florida has temporarily shortened the supply, and Dr. Morris quotes a paragraph from this paper recalling the sale of small-sized grape-fruit at thirty dollars a barrel. This means a retail price of at least a dollar each, and is, as Dr. Morris suggests, probably the highest price ever paid for specimens of the orange tribe.

No doubt, it will be a long time before there is any over-production of grape-fruit, since the demand for it increases every year, and it is constantly becoming more popular as a breakfast fruit. It is beautiful, is said to have medicinal value, and the more it is used the more highly it is relished. Beyond question it would be a profitable fruit to raise in the West Indies, and probably the English people will in time prize it more highly than they now do, and furnish an additional outlet for West Indian groves. Since the Florida frost this country has absorbed almost the whole West India supply, although much of it has been very inferior in quality. How does it happen that the enterprising orchardists of California have not been awake to the situation? There is no reason why they should not supply the east during a part of the year with all the grape-fruit needed. The limited quantities thus far received from California have lacked weight and juiciness. Wherever the fruit is grown it should be borne in mind that the highest success will only come with the use of the best varieties. There is no need to grow the thick-skinned and bitter sorts, or those with a dry, cottony pulp, when there are varieties both of the apple-shaped and pear-shaped fruits with silky skin, full of juice and of a most delightful flavor, with just enough bitter to give it piquancy and suggest its tonic quality.

An April Scene in Central Park.

BY the time this paper reaches our readers it is to be hoped that the weather will be cooler, but as we write the country is passing through one of those periods of intense heat, accompanied by a high percentage of humidity, which are characteristic of our climate. The deaths in this city and its suburbs, directly due to the temperature, during the past week are numbered by hundreds, so that the cool picture on page 335 seems like a mockery, or, at least, not especially seasonable. We present it at this time,

however, not primarily because of its beauty, although on the day when it was taken there were many portions of Central Park where the branches of conifers, bending beneath their weight of snow, made strikingly beautiful combinations. Just now, however, it will help to illustrate in a forcible way the character of our short spring season if the date of this snow-storm is taken in connection with the weather which immediately followed. On the fourth of April last the thermometer registered twenty-four degrees, Fahrenheit, and on the day preceding the mean between the lowest and highest temperature was two degrees below the freezing-point. Just one week later the mercury had risen to seventy-nine degrees, where it remained for two days, then rose on the 16th as high as eighty-seven degrees, and on the 18th, only eleven days after the snow-storm, it touched ninety-one degrees, which is about the temperature of these August days, when men and horses are dropping dead in the street from the heat. Nor did it at once subside to what may be called normal April weather, but it kept about eighty degrees for several days following. Of course, a temperature like this forced early vegetation into something like a hot-house growth. As the result of this August weather the Yulan Magnolias burst into bloom in mid-April, close after *M. stellata*, with the Forsythias, our native Spice-wood, *Cornus mas*, the early Bush Honeysuckles and some of the *Prunuses*, while the Peach-trees were in full bloom only a few days later.

All this can be readily understood by persons who are familiar with our spring weather, but it is so remote from any experience of our English readers that they can hardly appreciate such an abrupt transformation. As a rule, the early bulbous plants commence to flower in England several weeks before they do in this country, and then slowly and gradually there follow two or three months of spring weather until summer arrives in earnest. It may be practically winter here while Daffodils in England are at their best. But in a few days the season here will be abreast of the year in London, as our summer follows hard upon the heels of winter. One morning the woods will show a mist of tender green and the next they will appear almost in full leaf. Of course, such climatic difference as this must be taken into account when we undertake to grow plants which have developed under widely different conditions. No doubt, the people of England prefer their springs, and we can understand how attractive their slowly developing spring gardens must be. But we do not forget that the sudden leap into summer also has points of interest for the lover of nature, wild and cultivated. The new creation is a fresh surprise to us every year, and the suddenness with which vegetation bursts into life never fails to bring new surprises.

The Pines in August.

THE Pines near the coast are brilliant now with the Swamp Hibiscus. This magnificent plant, with large showy flowers five and six, and some even seven inches across, are thickly scattered over large areas. Some of the plants bear pure white flowers, others are white with a deep crimson eye, while others have varying shades of rose and peach-blossom color. It grows fairly well in the garden. Three or four summers ago I planted a small seedling in the border; to-day it has six stout stems with numerous branches laden with flowers, and is one of the most conspicuous things in the garden. Some of the flowers are seven inches in diameter, pure white, with a crimson eye. *Kosteletzkia* is a handsome plant of the same family, much like the Hibiscus, only smaller every way; the rose-purple flowers are about two inches across and do not vary in color like the Hibiscus. It is quite common near Wildwood, but not so abundant as the Hibiscus. Not far from *Kosteletzkia* the Glade Mallow, *Napæa*, is growing in a place where I supposed no conspicuous plant could escape me, yet here it was in an open damp place near a railroad. It is a tall herb with very large leaves, and the flowers are so arranged that with the

first glance I took it to be an umbelliferous plant. It is not specially handsome, but it is rare and unlike most of the Mallow family; more like a *Sida* than any other member of the order. *Parthenium integrifolium* is another plant that I had not found until this summer. It is a composite two to three feet high, with a flat corymb of white woolly flowers, and it remains in bloom a long time.

Clethra is an unusually handsome shrub just now, the long spikes of white fragrant flowers almost completely enveloping the bushes, which are very free from insect depredators both on foliage and flower, are perfect. This shrub merits a place in every flower garden; it is easy of culture; in fact, it will grow fairly well without any cultivation. I have a dozen or more plants in my wild garden, which receive no special care, and they are now full of flowers. The Button-bush is also attractive and grows everywhere in damp places. In the thickets wild Roses are still blooming almost as luxuriantly as in June. The Trumpet Honeysuckle is lovely, too, and combines well with the Roses, while *Hypericums* and *Spiræas* also add their charm to every mass of shrubs.

The two species of Meadow Beauty, *Rhexia Virginica* and *R. Marianna*, are both conspicuous among the Grasses in the damp Pines, along with *Polygala lutea* and *P. sanguinea*, while the *Lysimachias* and Swamp Loosestrife and the pretty *Coreopsis rosea* are all here, and the flaming Cardinal Flower stands above them all. The humming-birds and brilliant butterflies collect about the flower, seemingly attracted more by its brilliancy than by the sweets it furnishes.

Our Lilies are very showy now, especially *L. superbum*, with its great pyramid of nodding deep orange flowers, spotted on the inside with deep purple. Although it is called the Swamp Lily and grows naturally in low, wet ground, it thrives well in any position not too dry, and is especially handsome when grown in peaty soil like that usually furnished for *Rhododendrons*. *Apios tuberosa* is clambering among the shrubs and plants, catching hold of whatever it can reach, and often rising above its more showy neighbors, laden with short dense racemes of sweet-scented dull-purple flowers. *Mikania scandens* is also climbing among the bushes with panicles of flesh-colored flowers. The delicate rose-colored *Sabbatias* are coming into bloom, their dainty star-like blossoms thickly scattered among the feathery Grasses. They are among our most graceful wild flowers. Several species of *Gerardia* are showy now. *G. purpurea* and *G. maritima*, *G. tenuifolia* and *G. auriculata* are here, and in the more dry Pines we find the yellow ones, *G. flava* and *G. quercifolia*.

All through August the Ponds are more attractive than at any other time. Pond Lilies are still blooming, together with a host of other lovely flowers. The little Lake Flower is here, and so is the widely distributed Water-shield, *Brasenia peltata*. At least four continents can claim this plant. It is common in Japan, Australia and Africa, and I have read that it had been found in South America, but I believe this is not as yet well authenticated. The curious *Utricularias*, purple and yellow flowered, are abundant among the Lilies, and the little sacks are well-laden with the entrapped larvæ of mosquito, chironomus and entomoscans, and the *Droseras* in the more shallow places are entrapping the winged creatures, holding and folding their leaves around them in such a way that one seldom escapes.

Vineand, N. J.

Mary Treat.

Foreign Correspondence.

London Letter.

ODONTOGLOSSUM WATTIANUM.—This is one of the most beautiful of all *Odontoglossums*. It first flowered in the nursery of Messrs. F. Sander & Co. in 1890, when Mr. Rolfe described it as a probable natural hybrid between *O. luteopurpureum* and *O. Lindleyanum*. I saw a second plant of it in flower last week which appeared to bear

evidences that *O. Harryanum* was one of its parents. It has tall-branched scapes, bearing numerous flowers with sepals and petals as large as, and colored similarly to, those of a good form of *O. luteopurpureum*. The lip is, however, its most striking feature; it is about two inches long and an inch wide, the margins fringed and slightly incurved, the apex acuminate, and the color white, with a few large blotches of magenta-purple on the apical half and numerous small spots of the same color on the basal half. The lip hangs almost vertically, so that its colors are well displayed. Hybrid *Odontoglossums*, so-called, are generally disappointing as well as enigmatical, but *O. Wattianum*, whatever its origin, is a gem which all Orchid growers may honestly covet. It is to be hoped that Messrs. Sander & Co. will succeed either in propagating a stock of it or in importing it in quantity.

SOBRALIAS.—A large and well-cultivated collection of these plants is now to be seen in the nurseries of Messrs. F. Sander & Co., where they receive special attention, growing and flowering like weeds. There are few more pleasing Orchids than a good specimen of *Sobralia macrantha* or *S. xantholeuca* when in full flower, while a collection of a dozen or more distinct species and hybrids bearing numerous large variously colored flowers is a picture to delight the eye of any Orchid fancier. The best of the hybrids are *S. Amesiana* (*xantholeuca* × *Wilsoni*) and *S. Veitchii* (*macrantha* × *xantholeuca*), the former raised by Messrs. F. Sander & Co., the latter by Messrs. J. Veitch & Sons, and also by Messrs. Sander. Perhaps the most beautiful of all *Sobralias* is the white form of *S. macrantha*. This has enormous flowers of the snowiest white, except the rich yellow of the lip. *S. Wilsoni* was introduced from Central America in 1890. It is allied to *S. Warscewiczii* and has large white flowers tinted with rose and a yellow blotch on the lip.

HIPPEASTRUM STYLOSUM and **H. RETICULATUM.**—These two closely allied species of *Amaryllis* are now in flower in the stove, and they are decidedly beautiful, even when compared with those more gaudy offspring of the genus now so popular in the garden. *Hippeastrum stylosum* was first introduced three-quarters of a century ago, but it appears to have been lost for some time until again secured by Mr. O'Brien. It has bright green leaves an inch broad, an erect stout scape bearing an umbel of from three to eight flowers which are four inches long, trumpet-shaped, the upper part of the segments elegantly recurved and the color a close network of broad lines of rose-madder on a groundwork of a paler hue. *H. reticulatum* is not so rare a plant, and is grown here and there for its white-striped leaves (I have never seen a plant of it with wholly green leaves). Its flowers are like those of *H. stylosum*, but of a brighter red color, the reticulation also being more marked. It is an old garden plant, having been grown by Messrs. Lee, of Hammersmith, more than a century ago. Neither of these species has played any part in the production of the race of hybrid *Hippeastrums*.

ANTHURIUM SANDERIANUM.—This is the name borne by an extraordinary seedling or hybrid *Anthurium* which I recently saw in flower at St. Albans. It resembles the hybrids raised from *A. Andreanum* and allies in its leaf characters, robustness of growth, etc., but it differs from all others in having a spathe which is almost a normal leaf in nervation and size, while in color it is scarlet in the lower half, bright green in the upper half. The spathe in *Aroideæ* is, of course, generally understood to be a slightly modified leaf, but it always differs widely in shape and structure from the true foliage. Imagine a plant with an inflorescence like that of *A. Andreanum* so far as regards rachis, spadix and form, but in place of the ear-like spathe colored bright scarlet, a large cordate leaf attached to the spathe colored scarlet and green. In the distance this spathe has the appearance of the leaf of a gaudily colored *Caladium*. The plant bore about half a dozen inflorescences in various stages of development, all showing the same peculiar character.

LILIUM HENRYI.—While a considerable number of species of *Lilium* have suffered more or less severely from the excessive heat and drought recently experienced here, *Lilium Henryi* has, on the contrary, exceeded in growth and vigor all previous experiences. I am inclined to believe that sunstroke is the cause of the sudden collapse of fat healthy stems of *L. auratum*, probably also of *L. pardalinum* and others, almost a failure here this year. But *L. Henryi* is now nine feet high, with healthy green leaves down to the base and a score or more of orange-yellow flowers and buds. It has not gone back in health in the slightest since its first introduction from China, some eight years ago, although it has been left in beds in the open without disturbance. It seeds freely and the seeds germinate readily. A solitary plant of it is not effective, but a quantity growing together, as, for instance, in the case of *L. pardalinum*, make a stately picture. I might mention here that I saw in the nursery of Messrs. F. Sander & Co. the other day a large healthy batch of the rare *L. Philippinense*, one of the most elegant of the *Longiflorum* group. It requires greenhouse culture in this country.

MARLIAC'S WATER LILIES.—The exceptional length and heat of the summer we are now experiencing—it began in April, and so far has been almost tropical—has favored some plants, and particularly the hardy *Nymphæas*, which in some gardens have flowered freely as well as grown luxuriantly. The new red-flowered varieties have improved under its influence, or, rather, I should say, their good qualities have revealed themselves so clearly that they are sure to find general favor as hardy aquatics. They do not grow so vigorously as the common *Nymphæas*, except, perhaps, that called *Marliacea chromatella*, which appears to be by far the freest grower; they are, therefore, plants that must have special care and be kept in positions where they are easily seen and got at. Some who have tried them in lakes or large expanses of water have for this reason decided to remove them into tubs or small tanks. When seen at close quarters they are most beautiful. I know no flowers that grow in water in the open air in this country with colors so charming as those of the varieties called *Robinsoni*, *igneae*, *fulvae* and *odorata rosea* or *exquisita*. The best forms of *Laydekeri* are also first-rate.

LIMNANTHEMUM PELTATUM, better known, perhaps, by the name of *Villarsia nymphæoides*, is a most charming aquatic Gentian with floating leaves exactly like those of a *Nymphæa* and numerous erect-stalked bright yellow flowers. It is a native of the British Islands as well as various parts of Europe. In England, perhaps, the only locality for it is in various reaches of the Thames. It is abundant in a backwater separating the old deer park at Richmond from Kew Gardens, and it is also a conspicuous object in the lake in the latter establishment. If not already introduced into the United States, it is worthy of introduction, which may be possible either by seeds or rhizomes. No plant makes a more delightful picture on the water than this, which is in flower from June to August. It has lately attracted the attention of Mr. Grant Allen, who has contributed an interesting article upon it to the *Daily News*. Last year a pretty plate of it, prepared by Mr. Moon, was published in *The Garden*. Mr. Allen aptly likened the flowers to those of a Melon or Cucumber, but they are much more elegant in outline and delicate in texture, while the fringe of hairs surrounding the stamens adds a special charm. [This plant is common in aquatic gardens here, where it becomes almost a weed which it is difficult to exterminate.—ED.]

BEDDING VIOLAS, or Tufted Pansies, as some prefer to call them, have increased rapidly in popularity during the last ten years. This is the result of considerable improvements made by breeders in the constitution of the plants and in the colors of the flowers. In all good gardens they are now largely used for spring and summer bedding. They succeed where the larger-flowered Pansy fails, and they make a perpetual display for several months. They have become so important that a society has been formed in

their interests, and next week a conference will be devoted to them in Regents Park, when papers will be read by their votaries and the results of a trial of seedlings be made known. An exhibition of the plants and flowers will be held at the same time. This year has, perhaps, been one of the most unfavorable for these *Violas*. They have not been a success at Kew, notwithstanding liberal supplies of water during the hot dry weather. In gardens where the soil is colder and less gravelly than at Kew they have done better. They are most useful for early summer effects, and as they are easily kept from year to year and as readily multiplied as *Verbenas* they are sure to remain in favor.

London.

W. Watson.

Cultural Department.

Water-lilies from Seed.

THERE is always a fascination in raising plants from seeds. It requires some mental exertion and more or less patience, for while some seeds take but a few days to germinate, others require several months, and *Water-lilies* are among the uncertain plants. Naturally, seed is sown when thoroughly ripe, but the conditions are not favorable for immediate germination in all instances, and they lie dormant until the proper season or conditions for growth arrive. In the case of *Water-lilies* (*Nymphæa*), both hardy and tender, the seed, if ripened early in August and self-sown, will germinate in a few days. Seeds of the Zanzibar type can hardly be kept until they can be cleaned before they germinate; but later on if the seed is sown naturally and deposited in the tank or pond where it has grown it will lie dormant all winter, germinate early in spring and produce flowering plants the same season. Thus, in New Jersey, Zanzibar Lilies may be grown as a hardy annual.

As to the vitality of the seeds of aquatic plants much depends on their condition, the temperature, etc., when they are stored. Nature suggests that aquatic seeds should be sown as soon as ripe, or deposited in humid surroundings for safe-keeping. In some instances this is an inviolable law, many species refusing to grow if allowed to become dry and remain so for but a short period. This is true of *Victoria* seed, *Euryale*, *Nymphæa gigantea*, and almost all of the hardy *Nymphæas*, *Sagittarias* and others. This is the season for ripening *Nymphæa* and other seed, and persons desirous of experimenting with *Water-lilies* in the way of raising seedlings will do well to note these suggestions. Seeds of all varieties of hardy *Nymphæas* should be sown now, and the earlier they are sown the larger the percentage that will germinate. If seed cannot be secured before fall it may be sown then, but if left until next spring the percentage to germinate will be small, indeed, and with some varieties (unless extra care is taken in keeping them over winter) not a seed will grow. In natural ponds, where the seed is deposited during the latter part of this month, it remains dormant until spring, when with lengthening days and increasing temperature the seed readily starts and grows rapidly. Nature should be followed as closely as possible where artificial means must be adopted. Where only a few varieties are grown the seed may be sown in four-inch pots or in shallow pans, using fine soil similar to that used for other flower seeds, and covering the soil with fine sand after the seed is sown. The pots should then be stood in water, not submerged at once, but thoroughly saturated. They should remain in this condition for two days and then be submerged. If seed pans are used the seed may be sown thinly and remain undisturbed should they germinate before spring. The pans are always handy to move. If the seed is sown in pots a shallow tub or tank is most convenient to keep them in. To secure them against being upset, an ordinary tub may be filled two-thirds with ordinary soil. The pots should be plunged to the level of the soil and kept filled with water. The tub may remain out-of-doors in the open sunshine until fall, when, with its contents, it should be stored in a cold house or cellar until spring. But if the seedlings appear during autumn they should be kept growing in congenial quarters. Seeds may also be sown in a tub filled two-thirds with good soil, and the seeds covered with sand. They should be protected from freezing in winter and in spring, and placed out-of-doors again. The seed comes up readily and the plants may be set in permanent quarters without the trouble of pricking off, and will produce flowers the same season. Seeds of the Zanzibar type, if sown now thinly in pans, as already recommended for hardy varieties, will make nice plants this fall and may be held over till spring, when they will become good plants early in the season.

Riverton, N. J.

W. Tricker.



Fig 44.—View in Central Park, April 7th, 1896, from a photograph taken by Lucien C. Laudy for the American Museum of Natural History.—See page 332.

Notes from the Herbaceous Border.

STATICE LATIFOLIA is a hardy perennial which is very attractive in our borders just now. Its distinct character, its widely different appearance from any other plant now in bloom, and its usefulness for cutting unite to make it most desirable. We have well-grown plants with large masses of flowers four feet across. They are set at intervals about ten yards apart in the border, where they show up conspicuously beside such plants as *Rudbeckia speciosa*. The minute light blue flowers are produced in broad spreading panicles two feet or more in height. These panicles are singularly light and airy, but they last in good condition for several weeks, and, of course, are very useful for cutting. When mingled with other flowers they have the same effect as *Gypsophila paniculata*—that is, they are so light that they surround the whole as with a mist or halo, softening the colors and outlines of the stronger and brighter flowers in the mass. Our plants are well established and a single plant produces a number of panicles which form a dense round mass, composed of countless ramifications of flowering branches. The leaves are radical, broad, oblong elliptical, eight to ten inches in length and thick and leathery. To get good specimens this *Statice* must be planted in deep rich loose soil, in a sunny position. It is a very deep-rooting plant and does not suffer much from a dry summer. I have dug up plants whose thick roots were more than three feet down in the soil, and a deep, light loose soil is thus required. This plant never thrives so well if disturbed often, and it ought to be put in a position where it can be left for a number of years. About every fourth year we dig up all the plants from our herbaceous border and trench and enrich the soil. We are always careful to dig down deep under this *Statice* and get it up with a good ball of earth. It is easily raised from seed, but it takes the plants a number of years before they make a display of bloom like old-established plants. The native country of this plant is Siberia, and it was introduced from there more than a century ago. There are a number of other *Statice*s in bloom now, but none of them are as good as this one.

The *Wolfsbane*, *Aconitum lycoctonum*, is a desirable border plant that thrives and blossoms here every season. A thrifty, stout, angular-branched perennial about four feet high, it has showy cream-yellow flowers, which are produced in dense, elongated clusters at the ends of the branches. The leaves on this plant have long stalks, are reniform in outline, and are deeply incised and toothed. It thrives best here in a slightly shaded moist position, and if it has a favorable situation it is not so particular about the kind of soil it is grown in. The common *Monkshood*, *Aconitum napellus*, is also in bloom in the border, and is a showy plant when well grown. It is some four feet in height, with dark green smooth or slightly downy deeply cut leaves. The flowers are showy and curved in long erect terminal panicles two feet in length. Another *Monkshood* which blossomed here this summer and promises to make a showy border plant is *A. ranunculifolium*. This species has a raceme of creamy yellow flowers more than a yard in length. Last year it was raised from seed which came from the Botanic Garden at St. Petersburg. The *Monkshoods* are all more or less poisonous and ought to be kept in the herbaceous border or in places away from the kitchen garden.

In the back row of the herbaceous border large plants of *Gypsophila acutifolia* are blossoming freely now. This is a strong-growing plant and attains a height of nearly five feet. Its stems are clothed with glaucous acute leaves. The flowers are of fairly good size, and they are produced in enormous large trichotomous panicles. *Lepachys pinnata* is a striking plant when well grown. Here it is four feet tall, the stems well clothed with pinnate leaves. Its flower-heads are produced abundantly and the showy part of the flower-head is the long, drooping, light yellow ray-florets. It is quite hardy and does best in a light rich soil and an open position.

One of the early perennial *Sunflowers* suitable for the back row of the herbaceous border is *Helianthus rigidus*. It grows about four or five feet high and the flower-heads are raised well above the foliage on long stems. *Rudbeckia maxima* is acceptable when not too tall. Its smooth glaucous foliage introduces a pleasing contrast of color among the other plants in the border at this time. It is a handsome species with stout erect stems clothed with large ovate or oblong leaves. Its flower-heads are large and produced singly, or nearly always so, on long peduncles. The ray-flowers are a pure yellow, and, being over two inches in length, make a showy head. The long columnar disk is conspicuous. In rich soil this plant grows eight feet high, but in a poor light soil its height is generally five or six feet.

Rudbeckia speciosa is a compact, showy and desirable border plant. Near the front of the hardy herbaceous bed it is now making a great display. It is about two feet in height and its stems are clothed with roughish hairy, irregular-toothed leaves. Those on the upper part of the stem are sessile and lance-shaped, and those on the lower part are petioled oval lance-shaped. The showy flower-heads are produced at the ends of the branches and they measure about three inches across. The ray-flowers are an orange-yellow color, while the globose disk is nearly an inch in length. This *Rudbeckia* grows well here in a sunny position in the border, and the plants are of good size, measuring eighteen inches across. Such clumps produce a large number of flower-stems and make a fine display while they are in bloom. The plant shows the effect of dry weather sooner than any other plant in the border.

Echinacea purpurea is a distinct composite plant well worth a place in the border on account of the singular color of its flower-heads. It is a rigid stout perennial from three to four feet high, and its lower leaves are ovate and long-petioled, while those on the upper part of the stems are ovate-lanceolate. The stems are terminated by a large showy flower-head. The ray-flowers are distinct in color from most of the *Compositæ* that adorn our gardens at this time, and are of a rosy purple color and two inches or more in length. A light sandy soil seems to suit it best.

The Japanese variety of *Veronica longifolia* named *Subsiliis* is in perfection now, and is one of the finest hardy *Speedwells* in our collection. It grows from two to three feet high here, and has shortly petioled leaves from two to four inches long. It has showy, dense, stout spikes of deepest purple-blue flowers. The plants are attractive and always win admiration when in bloom. It succeeds best here in an open position in good deep loamy soil. It is easily increased by division. This is a comparatively new plant, having been introduced from Japan less than twenty years ago.

Veronica Virginica is in bloom now, and its whitish blossoms are quite distinct. The flowers are produced in long dense-clustered spikes. The plants are about four feet in height, the leaves produced in whorls along the stems. More than a year ago seeds of the Japanese variety of this plant were received from the Royal Botanic Gardens at Kew. Plants raised from the seeds blossomed this summer. The habit and color of the flowers are like those of our native species, but the Japanese variety blossomed more than a month earlier; in fact, before *V. Virginica* had any signs of flowering. The plants, too, are more compact in habit than those of our species, but, perhaps, this difference will be changed with age. *V. Virginica* and the Japan variety grow well in the border in a sunny position.

Botanic Garden, Harvard University.

Robert Cameron.

Some Novelties.—II.

POLYGONUM orientale pumilum album is the catalogue name of a new and really desirable garden annual. It grows about two feet high, begins to bloom early in June, and is covered now and promises to continue to produce its spikes of white flowers until frost. The plant is of good habit and would look well as an isolated specimen, or, better, when used next to or between *Zinnias* in a border. We hope to ripen seeds so as to have plenty for another year; only three came out of the packet purchased, but they came quickly and began to bloom when very small.

Cosmos as grown so far north is rarely enjoyed to its full extent outdoors owing to the frosts that usually cut it down, but last year we saw in Messrs. Suttons' trial-grounds a new race of early-flowering *Cosmos* which seemed to have merit, and this year it has been very generally distributed. We have had them in bloom for a month, so that they have got precocity, also the variety of colors, but it still remains to get good full flowers such as we see in the later varieties, but, doubtless, this will soon follow as the California cultivators get to work on them.

Crotalaria retusa, the annual golden-yellow flowering Pea, if it does not soon get to growing, will, I fear, not produce its racemes six to ten inches long of golden Sweet Peas. Hitherto it has absolutely refused to grow in spite of all coaxing. I wonder if this has been the experience of others.

Pennisetum Ruppellianum is the name of a new species of ornamental perennial Grass. The older and better-known species, *P. longistylum*, is one of the best known of border Grasses, and this one, according to promise, will produce crimson-purple plumes instead of white; a small packet of

seed has given us a nice lot of plants that promise to bloom later. It should be stated that these *Pennisetums* are not hardy, but can be easily wintered over with *Tritomas* and other half-hardy plants of similar nature. Beds of ornamental Grasses are very striking in suitable positions as isolated beds on the turf. *Arundo donax* and its variegated form, the three *Eulalias* (*E. variegata*, *E. zebrina* and *E. univittata*), the *Pennisetums*, and as a margin *Ophiopogon Jaburan variegatum*, are all admirable. This last is very beautiful, and perhaps the prettiest hardy variegated plant we have, and, though not a Grass, is very similar in appearance until the pretty spikes of blue flowers appear.

Spiraea Anthony Waterer is doing equally as well here as in its birthplace. Mr. Waterer remarked last year that its color was said to be not so good as when first exhibited, and the doubt presented itself that, perhaps, our hot sun might tend to fade the flowers, but no such effect is apparent. Very small rooted cuttings procured last spring are now flowering from every little twig, but next year, when the plants are stronger, we may expect to see it at its best. It is a dwarf shrub, but will prove very valuable for use as a marginal plant in decorative shrubbery, or even for summer bedding; it flowers perpetually.

Our greatest success this season has been with border *Pentstemons* treated as annuals. It was noted earlier in the year that this was the method now adopted by English growers, instead of keeping them over as rooted cuttings. The flower-spikes are very numerous now and will continue for some time in succession. It is a great satisfaction to know this, for many would grow them if it were known that the plants need not be wintered over. I doubt if the old plants will prove hardy, although the parents of this race are native North American plants; yet their identity is not easily traced now after about seventy years of hybridization. The colors vary from pure white to deepest crimson and purple, and the spikes resemble those of Foxgloves, but the flowers are in this strain much larger; the only thing they seem to insist on is rich moist soil, and we hope to mature seeds for a larger display another season.

South Lancaster, Mass.

E. O. Orpet.

Solanum Wendlandii.—Last year this plant was very fine in the greenhouse later in the season, but was too rampant for any but a very large structure, so we have this year tried it out-of-doors in the border, where it has been in bloom during the past few weeks, and will a little later make a fine display; each small shoot has a terminal flower-cluster of the prettiest shade of lavender-blue, and as the plant is hard-stemmed it is easily wintered over and may be set out again year after year. It is a native of Central America, and the most beautiful of all flowering *Solanums* known to cultivators. We find it easy to propagate from young shoots taken from the plant grown in the greenhouse; those taken from strong growth of a planted out specimen last fall did not root owing to the abundance of sap in them. It is best to take them from pot-plants and root them in an open bed of sand; in the propagating-case all will rot off.

South Lancaster, Mass.

E. O. O.

Correspondence.

The Compass Plant.

To the Editor of GARDEN AND FOREST:

Sir,—Is it true that there is on the prairies a Compass Plant, which is a safe guide for persons who get lost? I mean, do the leaves of this plant always point north and south so accurately that it would be a safe guide for one who was lost on the trackless prairie?

New Brunswick, N. J.

S.

[This letter was referred to the Rev. E. J. Hill, of Chicago, who is familiar with the flora of this region, and writes as follows:

"The Compass Plant, *Silphium laciniatum*, may be taken as a fair guide for distinguishing a general north and south, from an east and west direction. There is a tendency in the leaves to polarity, so there is also in the Prairie Dock, *S. terebinthinaceum*, which, so far as I know, has not been spoken of as a Compass Plant. And yet if one runs his eye over a field where these plants occur he would probably find seventy-five per cent. of them with their edges pointing in a north-south direction. But in both cases it is necessary to take into account the age of

the plant, and even the wetness or dryness of the season. It is the young plants which show the polarity best, or the leaves which become the radical leaves of the flowering plant. These twist more or less on the petioles, so as to present their faces to the east and west. But when the flower-stalk arises they are liable to drop away in various directions, some plants in a way so disorderly that no use could be made of them as a guide, others keeping their polarity very well. This is the case also, but in a less degree, with plants not sending up a flower-stalk, but whose leaves at the season are large and heavy. Those standing up stiffly show the best polarity, some quite effectually. The sessile leaves of the flower-stalk so twist the lower portion as to have the edges near the extremities, or the upper half, up and down, and with the meridional tendency. But this is hardly more so in the Compass Plant than in the stem-leaves of the Prickly Lettuce, *Lactuca scariola*, which, when standing in the full sunlight, twist in a similar way and have the meridional tendency. In a dry season, or with a lessened production of parenchyma, there is a diminished polarity. Professor B. D. Halsted (*Botanical Gazette*, July, 1887, page 161) has also noted this. In the cases he mentions the parenchyma was so reduced that the polarity was virtually destroyed, and the leaves would be useless as a guide. The way to use the plants as a guide, so far as I have observed, would be to take the mean of many observations. By doing so one might approximately, or, in cases, quite accurately, hit upon north and south.

"Professor C. E. Bessey (*American Naturalist*, August, 1877, page 486) has some accurate observation on this plant, with instructive tables showing the amount of variation. Of ninety-three leaves taken but one was accurately north and south. All the rest deviated from 15° to 89° 30', virtually east and west. He says: 'Taking the bearings of all the leaves observed we find that about thirty per cent. did not vary more than five degrees, forty-two per cent. not more than ten degrees, and ninety per cent. not more than forty-five degrees from the meridian.' Dr. Engelmann (*Works*, page 533, an extract from *The Gardeners' Chronicle*, February 26th, 1881), after describing the arrangement and position of the leaves of the plant, gives his opinion of their polarity by a reference as follows: 'Sir Joseph Hooker's remark about the appearance of a plain covered with this *Silphium* from a railroad train is quite correct, and any change in the direction of the road becomes visible at once through the altered appearance of the leaves of the Compass Plant.' This indicates a degree of reliability on its guiding power."—Ed.]

Rhododendron maximum in Connecticut.

To the Editor of GARDEN AND FOREST:

Sir,—It is not generally known that there are at least three stations in the state of Connecticut where *Rhododendron maximum* thrives with luxuriance under conditions which are apparently most congenial. Such a group exists near the town of Milton, Litchfield County. A visit to this place when the plants were in flower gave me an opportunity to observe a truly wonderful sight. The site is a thickly wooded swamp well up in the mountains, where for ages, apparently, there has been accumulating a peaty formation until the soil is entirely of vegetable origin for a depth of at least six to eight feet, and so soft and yielding that the larger growth of Hemlock, Yellow Birch and Black Birch, Black Ash, American Elm, Red Maple, etc., find no sufficient support, as is clearly shown by the many that have been blown down, and the others that do not stand perpendicularly. I was informed that this basin does not overflow, neither is there standing water in sight, but the soil has the appearance of having grown above the water-level by slow accumulations, and now acts like a sponge, keeping moist continually by absorption, while the heavy tree-growth overhead tends to maintain an equable temperature. It is sufficiently moist to maintain a most vigorous growth of *Sphagnum* and other moisture-loving Mosses, many of the woods Ferns, Boxberry, Gold Thread, Partridge-berry, etc.

This group of *Rhododendrons* occupies an area of about

250 feet in diameter, and is almost circular, with a detached group about 150 feet away, covering an area some twenty-five feet square. A thorough search of the vicinity, including the damp, mossy, wooded margins of the swamp, where the *Kalmia* produces seedlings freely, revealed not a single seedling plant of this *Rhododendron*.

The only apparent means of perpetuation and increase seemed to be by natural layering. In fact, it is quite impossible to pick out an independent specimen from the group, as the multitude of overlapping branches, heavy with most luxuriant leaves, force one another to the ground, where they take root, and the vigor of the new root-system establishes in each case an almost independent plant, while remaining part of the great system of layers. This network of layers, forming the great group, has become a thick and impenetrable mass of stems and heavy foliage, reaching in places to a height of ten or fifteen feet and hugging the ground at the margins. A study of the mass would lead one to infer that this species of *Rhododendron*, at least, will thrive luxuriantly in a soil made up entirely of vegetable mold, provided a certain degree of moisture can be maintained; also that it finds a most congenial home under the shade of tall trees, where the sunlight finds its way through the leaves but sparingly.

The preservation of this interesting group should be assured in some way, either by purchase or by the enactment of laws, to protect the plants from the depredations of visitors, who come in increasing numbers each year, I am told, breaking them down and taking away by the wagon-load not only the flowers, but often masses of roots and branch.

New Haven, Conn.

E. F. Coe.

Church Bouquets.

To the Editor of GARDEN AND FOREST:

Sir,—The floral baseballs that in many places appear for bouquets are, perhaps, never so distressing as when seen in churches. To sit for an hour before the imprisoned flowers, cruelly crowded into a space only large enough for half a dozen, and with no spray or leaf to veil their misery, is a misfortune of itself, and it is intensified by the frightful combinations of color too often used. Simple combinations, good in design and coloring, of the material at hand from week to week throughout the season, would make a series of object-lessons that surely might fitly accompany the sermons in many a country, village or suburban church.

I have taken great pleasure in supplying bouquets for a church of this village lately, and the attention they have attracted, as well as the favorable comments heard, seems to prove that this is an opening for unobtrusive yet effective floral missionary work. I have not used imported hot-house flowers, nor anything strange or unusual, although sorely tempted to do so once or twice by delightful gifts of Orchids from more sophisticated regions, but merely the every-day material available in gardens or wildwood.

The examples have included such simple arrangements as a glass rose bowl filled with *Nasturtiums* in variety, with buds and leaves; jars of the branches of wild Crab Apple, cultivated Cherry and Apple blossoms, and once (a delightful find) of English Hawthorn, the branches mingled with delicate sprays of Bridal Wreath. These were all disposed openly in jars or vases of harmonious tints—clear glass seeming always a safe choice.

Necessity often led to combinations, and the first and most refined of all seemed at first glance most difficult to treat. In a slender white and light green Japanese vase ten inches high I placed, perhaps, two dozen May-apple blossoms (*Podophylum*) on their full-length stems, removing the green umbrella-like leaves from all but about five or six, and below them an encircling, but not overcrowding mass of Maiden-hair Ferns. Another Sunday a crystal rose bowl held a loose bunch of nodding Bluebells with their own foliage, some of the flowers being as pink as the buds, and others flesh-colored, or nearly white. An extremely decorative bouquet was made of splendid pink *Pæonies* of immense size, veiled in the "smoke" of the Purple-fringe tree. This was for a special occasion, and was very large. A receptacle was constructed to suit it by propping an ordinary glass fruit-jar in an olive-green, horizontally ribbed jardinière seven and a quarter inches high and seven and a half across at the top, slightly larger below. With clear rose-pink *Pæonies* the combination is magical if the flowers are judiciously distributed among the feathery heads and massed more closely toward the base of the bunch.

A highly glazed vase nine inches high and seven and a half inches in diameter in the largest part, fluted vertically into melon-shaped divisions and shading in color from yellow-

green at the base through greenish yellow, and reddish yellow to deep yellow-red at the neck, was made to serve for a good many bouquets despite its odd coloring. Nearly anything looks well in it except pink, rose, crimson or magenta flowers. Quite a family of bouquets that appeared from time to time in this vase were based on red, yellow-red, yellow and white *Zinnias* mingled with *Gladioli* of harmonious hues, with their own leaves, and the different small-flowered white Clematises, Cinnamon-vine, useful and delightful for bouquets and house decoration generally, and, still later in the season, with trails of Hop-vines. The gracefully drooping clusters of hops seem to lend themselves to such work in the most obliging fashion. This combination was varied by the use of perennial Sun-flowers, certain red, yellow and white Dahlias, white *Speciosum* Lilies, etc., as opportunity offered, and occasionally a spike of Water Hyacinth was set against a background of scarlet just above the dark red of the vase, which carried out the color scheme by showing through its drooping drapery. For a feature of all of these bouquets was the use of the fine white flowers of the vines among the stiffer ones to give softness, and long branches trailing from the vase, as it stood on a small table, quite to the floor inside the altar-rail. Big bunches of Goldenrod and Asters looked wonderfully well in it, and nothing that went to church in the green-yellow-red jar attracted, nor deserved, more attention than some branches of pure yellow leaves from a Hard Maple relieved by the first spray of the scarlet, green, red and yellow foliage of the soft Maples that in certain favorable seasons transform some of our commonplace village streets into long aisles of shimmering cathedral colors.

Brighton, Ill.

Fanny Copley Seavey.

The Forest.

The Burma Teak Forests.—III.

GIRDLING OF TEAK.

IT will now be necessary to explain that a Teak-tree before it can be cut must first be killed by girdling it. The only practicable method of bringing the Teak timber of Burma to market is by floating it. To the water's edge the logs are dragged by oxen, by buffaloes and by elephants. The dragging is done during the rains and the early part of the dry season, when the ground is moist and slippery, so that heavy timber glides easier. Down the smaller streams the logs are floated singly during the rains, and when they reach the main stream they are collected and formed into rafts. Teak timber has about the weight of Oak or Chestnut; unlike the wood of Pines and other coniferous trees, it does not float unless it is perfectly dry, and from time immemorial this has in Burma been effected by girdling the trees. A broad circular cut is made through bark and sap-wood right into the dark brown heart-wood, which, when first cut, has a beautiful golden yellowish brown color. In Teak, as in all trees with a distinctly marked heart-wood, the sap ascends through the sap-wood only; hence, if the communication of the sap-wood below and above the girdle is interrupted, the tree is killed. Within two or three days the leaves wither and the tree dies. But if the smallest thread of sap-wood is left the tree continues to live. Timber well girdled dries completely and seasons evenly, for it is on all sides freely exposed to sun and wind. Smaller trees dry sufficiently if left standing after girdling for one or two years; larger trees must stand longer. When a Teak-tree is felled green that side of the trunk which is in contact with the ground takes a long time to dry, the timber seasons unevenly, it is less useful and less durable, and when thrown into the water it does not float readily.

This excellent practice, as a matter of course, I maintained, but one of the many battles I had to fight during my Indian career was against those who condemned this practice as useless, as barbarous, as injurious to the timber, and likely to damage the reputation of Burma Teak, while others described girdling as the outcome of German theories. In reality it was an old Burmese practice, to which the good reputation of Burma Teak was mainly due.

ANNUAL YIELD FIXED.

The next question which presented itself to me after my first tour through the forests in 1856 was, what proportion of the first-class trees might be cut annually in the different forest districts. Although the proportion of first and second class trees had been found to vary much in different localities, yet, upon the whole, I considered myself justified in assuming that there were as many trees of the second class in the forests as of the first class; further, that the younger trees, those of the

third and fourth classes, were sufficiently numerous so as eventually to replace those of the second. Lastly, the data collected regarding rate of growth of the Teak-tree seemed to justify the assumption that within a period of twenty-four years all trees of the second class would grow up into first-class trees. On the ground of these data it was decided to spread the girdling of the first-class trees standing in the forests over a period of twenty-four years. The forest districts were grouped into six main divisions, a plan of operations was made for six years, and it was settled that one of the six divisions should be taken in hand each year. The valuation surveys seemed to justify the assumption that there were not less than 585,000 first-class trees in the forests, one-fourth of which, it was proposed, should be girdled during these first six years. For the selection of the trees to be girdled definite rules were laid down, the most important of which was that never more than one in four of the first-class trees in one locality should be girdled; that isolated trees should be spared, and that trees overshadowing groups of young Teak, as well as old trees and those which showed signs of decline, should be girdled in preference to others.

These provisions related to the Pegu forests only. In 1858, however, those of the adjoining provinces of Martaban and Tenasserim were added to my charge, the system of linear valuation surveys was steadily continued, so that in 1860 the Teak-trees of the different classes had been counted upon an aggregate area, in the different districts, of 35,000 acres. The plan of girdling was continued for another six years to the end of 1867 on the same principles as those adopted for Pegu in 1856. During these twelve years, from 1856 to 1867, the number of trees girdled amounted on an average to 24,300 a year. This was in the three provinces, the forests of which at that time were under my charge in Pegu, Martaban and Tenasserim, which, together with Arrakan, were subsequently united in one province under the designation of British Burma.

WORKING PLAN OF 1868.

In November, 1862, I was called to Calcutta to organize forest administration in the other provinces under the Government of India, but, though I no longer had charge of the Burma forests, I paid frequent visits to my old province and endeavored, as much as possible, to regulate the working of its forests. Thus, in 1868, I spent three months in Burma in order to prepare, with the aid of the local officers, a new working plan for the forests. Like that of 1856, this working plan was based upon the result of linear valuation surveys, and upon what was known regarding the rate of growth. The valuation surveys extended over 39,700 acres, or three per cent. of the area to which the working plan was intended to apply. The total area was divided into forty-seven districts under five main divisions, and upon the results of the valuation surveys, together with the knowledge which the local officers had acquired regarding each district, an estimate of the number of first-class trees in each district was based. For the entire area this estimate amounted to 934,000 trees, six feet in girth and upward. The estimate of 1856, it will be remembered, was for Pegu only. As regards rate of growth, convincing proof had been obtained that the concentric rings visible in Teak timber actually represented one year's growth. For younger trees this proof was obtained by the examination of trees raised in the Nilambur plantations, the oldest of which were then twenty-five years old. For older trees a fearful cyclone of October, 1864, had furnished the data; it had blown down a large number of old Teak-trees of known age planted near Calcutta, and sections of the stems were at once examined. Accordingly, the rate of growth was now based upon the counting of annual rings on butt ends of logs collected at the Rangoon timber depot. I will not weary the reader with details, suffice it to say that while the rate of growth assumed in 1856 was too rapid, that of 1868 was much too slow. No less than seventy-two years were supposed to be necessary to bring up a Teak-tree in the forests from a girth of four feet six inches to six feet, against twenty-three years in 1856. The second-class trees having also been found to be less numerous than those of the first class, it was decided to spread the removal of the latter over a period of eighty years. Thus, the maximum annual yield was fixed at 11,600 trees against 24,300, the mean number actually girdled during the first period ending in 1868. This yield was fixed for five years only, because it was hoped that rapid progress would now be made in the selection and demarcation of the forests permanently to be maintained as such, and that when the boundaries of these forests had been laid down special working plans for each forest district would then be prepared.

DEMARCATON OF RESERVED FORESTS.

However, in those days it was not all plain sailing in regard to forest matters in Burma. The theory had been advanced that the right thing to do would be altogether to abandon the care of the natural forests, to cut the marketable timber which they contained as speedily as possible, and for future timber supplies to rely entirely upon plantations to be made on the outskirts of the forests, or outside the forests in localities less feverish, where labor could be had at all seasons of the year. Vigorous progress in demarcating reserved forests was not made until 1876. Fortunately, after the five years had expired for which the working plan of 1868 had provided, girdling operations were carried on cautiously and sparingly. The result, highly beneficial as regards the development of the growing stock of Teak, was that during the period from 1868-9 to 1878-9 only 7,900 trees annually were girdled.

This may be termed the second period in regard to the working of the forests. The third period commenced in 1880, when I again spent four months in Burma. At that time a considerable area of reserves had been formed, and the work of demarcation and settlement of state forests was progressing steadily. It was time now to treat the reserves and those areas intended to be included within reserves differently from the tracts intended to be given up for the extension of cultivation. In the reserves girdling would hereafter be regulated by special working plans, while outside all marketable trees might at once be girdled. Pending the preparation of special working plans, girdling operations within the reserves were conducted very sparingly. Upon these lines the work was carried on during the fifteen years from 1879-80 to 1893-4. At first the trees girdled outside prevailed, but gradually, as special working plans were prepared, the trees girdled in these areas increased. In 1893-4 the number girdled within the limits of reserves equaled those girdled outside.

Bonn, Germany.

Dietrich Brandis.

Recent Publications.

American Grape-growing and Wine-making. By George Husmann. New York: Orange Judd Company. 1896.

This is a new edition of a well-known book, so completely revised that it is almost a new one. Besides the original and general directions for viticulture which were prepared for the central and eastern parts of the United States, there has been added an interesting set of experiences in the form of short letters from growers of central Ohio, the Grape district of central New York, the Chautauqua belt, the Hudson River Valley, south-western Missouri, Mississippi, New Mexico and Texas. These experiences are very brief, but since they have been prepared by such men as George W. Campbell, Hermann Jaeger, Samuel Miller and T. V. Munson they ought to have considerable authority as regards the varieties suited to different regions.

The chapters devoted to wine-making do not pretend to go into any elaborate explanations of the special processes and refinements of the art, but simply to set forth in a plain way the rules which are necessary for the grower who wishes to make a palatable wine for home use and to enable the small vineyardist to produce an article which will be salable. All that the novice needs to know of cellars and cellar furniture, of the methods of gathering and pressing and fermenting, is here briefly told, and there is an enumeration of the varieties which are best adapted for making various kinds of wine. Grape-growing in California, where the Vines are all of the Vini-fera type and where the climate has little resemblance to that of the east, is quite a different art from grape-growing here, where the varieties are all selected and improved native sorts, with only an occasional infusion of foreign blood. Wine-making in the east and in the west differs quite as widely. With grapes as cheap as they have been for several seasons at wholesale, it ought to be possible in California, in New York, and especially in our south-western states, to make a wine that is at once cheap, pure and palatable. If this has been done to any large extent in America the fact does not seem to be generally known among wine drinkers.

Notes.

According to *The Gardeners' Magazine*, candidates for degrees in horticulture in the Victoria University, in addition to their written papers, will be tested by a practical examination to show their proficiency. It would be interesting to know more specifically what is the nature of this practical examination.

Mr. Carman speaks in high praise of the Pea, New Life, which he considers the most productive and valuable of its season. On the 6th of July the vines were two feet high, vigorous and of uniform growth, and the straight bright green pods, three to four inches long, each contained from five to eight seeds of the largest size. The peas mature just before those of Stratagem and Heroine.

A correspondent of *The Rural New Yorker* writes that the Crimson Rambler Rose does all that has been claimed for it, is especially good in foliage and in the abundance of its large clusters of flowers. He notes two defects, however, one of which is that it is not as fragrant as a good rose should be, and the second is that the flowers which open first begin to drop their petals before the others expand, and in this way the beauty of the whole cluster is marred.

At the exhibition of the Massachusetts Horticultural Society on August 8th, a silver medal was awarded to Mr. Robert Cameron, of the Harvard Botanic Garden, for a display of the flowers of showy annuals. The collection filled two hundred large vases and embraced 140 species and varieties. Mr. Cameron also received from the same society on the 25th of July a silver medal for the flowers of perennial herbaceous plants, which filled 150 vases and consisted of eighty species and varieties.

In the making of wine in California there is considerable loss on account of the undue heat, which arrests fermentation before the proper time, so that the wine must be graded as inferior or else made into brandy. Professor Hayne, of the University of California, has devised a machine for reducing the temperature of wine at fermentation by bringing it into contact with cold water pipes. The apparatus has been tested successfully at the University, and it is to have a practical trial at once in one of the largest vineyards in Sacramento County.

For some years inventors have been trying to transport fruit in cars filled with carbonic acid gas. Inasmuch as the germs of fermentation cannot live in this gas it is assumed that no ice would be needed, and since this is both heavy and expensive it is thought that fruit can be transported for long distances much more cheaply in the new way. A car-load of fruit in one of these gas cars was lately sent from San José, California, to Chicago, but the result was not satisfactory. It is reported in the local papers that the fruit had not rotted, but owing to the extreme hot weather it had almost been cooked. Ice will still be a necessity in very hot weather unless some means of keeping the car cool is added to the antiseptic advantages of the gas.

We have received from Mr. William Tricker flowers of *Nymphæa Sturtevantii*, which was figured in this journal, vol. vii., page 354, and also of *N. O'Marana*, which we described in our last volume, page 95. The latter flowers are considerably larger, being nearly a foot across, with heavier stems and of a pink so deep as to be almost red, but since the petals of this flower grow darker with age they may have been originally of no richer color than those of *N. Sturtevantii*. Altogether the new Lily seems an improvement upon its parent—it is a cross between *N. dentata* and *N. Sturtevantii*—especially since Mr. Tricker says that it is more floriferous, that it grows more freely, and, in fact, quite as freely as any other plant of its class.

A correspondent of the *Arizona Gazette* writes that the setting apart of the San Carlos Reserve for the Apache Indians twenty years ago has preserved "the largest continuous belt of forest in the United States," namely, that which clothes the Mogollon and the Sierra Blanca. In southern Arizona the forests have largely been sacrificed to the interests of the stockmen and lumbermen, and the rich, fine soil that once covered hill and valley has already been scoured and gullied until in many places nothing but the rock skeleton of the landscape remains. The writer urges that this San Carlos forest, which has thus far been saved with some that lies adjacent, ought to be rescued and set apart as a forest reservation since the Salt, the Verde and the Little Colorado rivers all take their rise and receive their supply from this source.

Mangoes from the West Indies are rather more common in the fancy-fruit stores than usual this year, but whether it is because only inferior varieties are sent here, or because the fruits are picked too green, the fact is that none of the samples which reach this city justify the high esteem with which this fruit is held in the tropics. As a rule, in the West Indies little care is taken to select and improve varieties, and, no doubt, the seedlings of this tree, *Mangifera Indica*, vary quite as much as apples do. Mammee apples of fair size are also now to be had, and are often four or five inches in diameter. In its native habitat the fruit is often as big as a child's head and of a beautiful yellow color. The flesh has an aromatic flavor, and as received here it is palatable when served with wine and sugar. Alligator pears, the fruit of *Persea gratissima*, come here in much better condition than the two fruits named above, and there is an increasing demand for them on account of their firm, marrow-like pulp, which is more often served here as a salad than in any other way.

Mr. Joseph Meehan writes to *The Country Gentleman* that Clapp's Favorite is esteemed about Philadelphia as the very best of early pears. This fruit should not be condemned because it rots at the core when overripe, as this can be avoided if one knows how to ripen it properly. The first picking in that part of Pennsylvania was made this year before the end of July, and in late seasons it should be picked before the middle of August. The fruit is gathered in three installments about a week apart to have a succession, and if it is put in a close closet it will be in fit condition to eat in a week or ten days. Of course, it does not keep well—no early fruit does—but when ripened in this way it is a beautiful fruit, perfect throughout, juicy and refreshing. One good quality of this variety is that it rarely fails to bear a good crop. In a little orchard well known to Mr. Meehan it has not missed a good crop for ten years, and now when there is not a fruit on Tyson, Sheldon Jones and Belle Lucrative, and but a few on Bartlett and Lawrence, trees of Clapp's Favorite are bending with their load of fruit.

There never has been a more trying week for fruiterers and greengrocers in this city than the last. With a temperature at ninety-five degrees fruit ripens so rapidly that it must be sold at once or not at all. Pears which were green in the morning were dead ripe in the afternoon and hardly fit to use next day. This trouble was aggravated by an unusually large supply, and since buyers had little energy for anything beyond the effort to keep themselves cool with iced drinks, it is little wonder that all kinds of fruit were sold at sacrificing figures. Tragedy prunes are about past and Gros prunes are just beginning to arrive. Highly colored apples of fine size when carefully collected and packed are selling fairly, but ordinary kinds like Orange Pippins can hardly be given away. Early apples are always an uncertain crop for growers, as they must be disposed of quickly, being almost as perishable as peaches. Besides this, few summer apples are of such high quality as the later ones. But, after all, the very best of sauce is made with the summer fruit, and good fresh-apple sauce is quite as appetizing and wholesome as any berries or other fruit of the season.

The great Hale Peach orchard, in Georgia, covers 1,078 acres, 600 of which are in bearing trees, and the remainder in nursery stock. There are avenues running north and south through the orchard 500 feet apart, with a cross road every 1,000 feet. There are two large packing-houses a hundred feet long and forty feet wide and two stories high, and a lodging-house or hotel has just been built for the help. Last year some four hundred helpers camped in barns, wagons, tents, etc. At picking-time about five hundred men and women, chiefly colored, and seventy-five horses and mules are employed, while fifty men and thirty mules are employed the year round. At the lodging-house rooms and beds are free, and board costs \$2.50 a week, while families and parties can furnish their own food and have it cooked for themselves if they choose. This year the curculio attacked the Peaches, and Mr. Hale waged prompt war upon the insects, jarring the trees and catching the insects in sheets tacked to light semicircular hoop frames. Two of these were brought together about a tree which was struck by a rubber-padded club, and the insects which dropped were then thrown into buckets and carried by boys to barrels in wagons and drawn away to be burned with the stung fruit which dropped with them. Fifty men were busy for nearly two months, from early April onward, at this work, which cost \$4,000. But while in other orchards from sixty to ninety per cent. of the fruit was lost, and in some orchards the entire crop, the Hale orchard alone had a full crop, and many of the trees were so overloaded that they required severe thinning by hand.

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Various Motives for Gardening.

WE have just received a letter from a valued correspondent in which he says that he cannot understand the insistence of GARDEN AND FOREST upon planning and planting for general effect. He delights in his garden, but his pleasure is not associated in any degree with the landscape as he understands it. He loves plants, he appreciates the beauty of flowers, he enjoys their companionship and he reads with interest everything that is said about new or old ones which any way broadens his knowledge of their habits and helps him to cultivate them more successfully. He finds abundant comfort in gardening of this kind, but he sees nothing to attract him in landscape-gardening. No doubt, this statement represents the innermost feeling of many people who take a genuine interest in horticulture, and it is often expressed to us in one way or another. With people of this taste and temperament the garden exists for its plants, and the plants are not grown for the sake of the garden. That is, a garden in this view is a place where a collection of plants is carefully attended and enjoyed for their individual beauty and other interesting qualities, and with no purpose of forming, in connection with the house, any picture which is to be studied and enjoyed as a whole. Perhaps the majority of all who are interested in gardens sympathize with the view of our correspondent, and they find a real pleasure, and pleasure of a most refining and refreshing kind, in their practice. It is our belief, however, that they might do all this, and at the same time gain a new and ever-growing satisfaction if they gave thought to the general modeling and arrangement of the whole scene as well as to its individual details.

No doubt, the word "landscape" is something misleading when the term landscape-gardening is applied to small areas, but, then, we have no phrase to take its place. In the design of a village plot we may have nothing to do with the material that was in Lowell's mind when he said, "A real landscape never presents itself to us as a disjointed succession of isolated particulars, its lights, its shadows, its melting gradations of distance." In ordinary use, the word "landscape"

conveys an idea of some spaciousness—a foreground, a middle distance and a distance—but, nevertheless, it is possible even in a limited space to carry out a scheme which as a whole makes a distinct and consistent appeal to the eye and to the imagination. Such a garden must embody and express some idea which the observer can feel and appreciate. It may be made a type of coziness or of simple homelike restfulness or of inviting hospitality or even of studied elegance, but to achieve such a result is not easy. Nevertheless, a moderate-sized house-scene may be a genuine work of art which displays the creative touch of genius. This only comes to pass when the true artist discovers the hidden poetry of the place, and knows how to handle and adjust all his material to give the theme its full and complete expression.

Landscape-gardening of this type is much more than the arrangement of plants and trees so as to exhibit harmonies of form and color. It is possible to make beautiful and effective arrangements without attempting any such expression as we have alluded to, and yet the arrangement of plants solely for the sake of their form and color may be truly artistic. It requires the same kind of skill which groups cut flowers into effective bouquets or arranges them into effective table decorations, or which creates a charming mosaic pavement out of bits of different-colored stone. No doubt, our correspondent, who loves each plant as an individual, will understand that he can enjoy his Ascension Lilies and his Delphiniums just as thoroughly as he now does if they were planted together, so that each would heighten the beauty of the other, or he can appreciate in what exquisite harmony his white and yellow *Eschscholtzias* dwell together, or how the attractiveness of his white and scarlet Poppies is emphasized when under a glowing sun they are seen against a mass of dark foliage. Whatever name is given to the art which achieves such pleasing combinations it certainly is worth study, and it brings with it a high order of pleasure. Without it there can be good formal arrangements in connection with architecture, no success in regular planting which ought to be an essential feature in many small and geometrical areas. This kind of art differs, perhaps, from what we generally know as landscape-art, in that it appeals more directly to the æsthetic sense and can hardly be said to move the emotions.

Now, the man who loves his plants for their own sake may still arrange them so as to make an effective display of form and color, or he may subordinate them to the creation of a landscape picture which expresses some idea, some inner meaning, but no one can justly find fault with him if he goes on as he is now doing and enjoys his plants simply for what each one is to him. His garden will be a constantly increasing solace and refreshment and he will take a keen delight in it. It is gardeners of this sort who make a personal acquaintance with their plants and by an intimate study of them discover all their secrets, their habits and even their whims. They find something new every morning, something to invite study or admiration. They are the men who become our ablest instructors in all points of culture. Mr. Olmsted has somewhere called this art-specimen-gardening, to distinguish it from *parterre-gardening* and *landscape-gardening* proper.

A MEMBER of the New Jersey Forestry Association asks us for an approximate estimate of the number of acres of timber-land still owned by the National Government. Unfortunately, we have no information on this point which is sufficiently accurate to base a guess upon. Aside from the forest reservations the Government may possess so-called forest-lands to the extent of twenty-five million acres or of twice that amount. This area is passing into private hands and vanishing at the rate of a million acres a year, or, perhaps, two million, no one knows. The stumpage value of the timber stolen every year may be a million dollars, or more, but no one knows. No one knows

how much timber the flocks and herds destroy, nor how much is annually burned up. We do know that every year corporations and individuals are acquiring title to hundreds of thousands of acres of forest-land which should be kept in forest forever. We do know that there are no laws to properly protect our forest. We do know that even the inadequate laws on the statute-books are not enforced. We do know and we have known enough for years to make our neglect of this great property, with all its beneficent possibilities for the future, a national disgrace. Certainly the Forest Commission which is now in the field ought to be able to make a report which will stir the country and drive those who make and administer our laws to some efficient action.

The Necessity of Planning.

THE daily work of the architect and the landscape-architect is popularly supposed to consist in ornamenting lands and buildings so as to make them appear beautiful. Rooms may be inconveniently and awkwardly shaped, but they can be "beautified" by rich furniture and upholstery. Whole buildings may be irrationally planned, but they may still be made "artistic" by means of mouldings, carvings and mosaic. House grounds and college grounds, private gardens and public parks may be senselessly, as well as ineffectively, arranged, but they may still be glorified by yellow and purple leafage. In short, "The world is still deceived with ornament."

On the other hand, although all seekers for the truth concerning beauty have discerned elements which defy analysis, such special students have nevertheless deduced from the visible and historical facts a whole series of fixed principles, which are quite as surely established as any of the other so-called laws of nature. Among these, perhaps, the most important is this, that "in all the arts which serve the use, convenience or comfort of man, from gardening and building down to the designing of the humblest utensil which it is desired to make beautiful, utility and fitness for intended purpose must be first considered." It is to be remembered that this is not theory but law. As a matter of fact and experience satisfying beauty is not won unless the law of nature is obeyed.

That faithful and well-reasoned planning for the accomplishment of purpose is necessary to the success of the work of architects of buildings is now generally understood. "A plan" is a skillful combination of convenience with effectiveness of arrangement. "A design" is made up of plan, construction and outward appearance, and by no means consists of the latter only. Indeed, the external aspect of a structure depends directly on the mode of construction, the construction depends, in turn, on the plan, and the plan on the purpose in view; with the result that the whole appearance of the building inevitably and naturally expresses this purpose.

If it be true that expression, character, and even beauty are thus most surely won, in the case of buildings, by keeping decoration subsidiary and designing with purpose in view from the start, it is equally true of all the wide field of architecture, using the word in its broadest imaginable sense. "Architecture, a great subject, truly," says William Morris, "for it embraces the consideration of the whole of the external surroundings of the life of man; we cannot escape from it if we would, for it means the moulding and altering to human needs of the very face of the earth itself." A bushy pasture or a smooth green field in forest-clad New England is as truly a product of human handiwork as a green meadow in treeless and dusty Utah, yet each is beautiful, and neither owes a particle of its beauty to decoration. The English deer-park, with its broad-spreading trees, or the church-yard, with its ancient stones and yews, the typical Yankee farm with its low buildings and great Elms, or the Live Oaks and quaint structures of the plantations of Louisiana, these and all similarly interesting landscapes are interesting, not because

they have been decorated, but because they are strongly characterized and highly expressive. Their moving beauty is the natural product of straightforward work for the adaptation of land and landscape to human needs and uses.

Believing these things, it will be impossible for us, when a tract of land is newly dedicated to some special purpose, be it that of a suburban lot, a railroad-station yard, a new village, a country-seat or a public park, to stand by and see it thoughtlessly laid out and then, perhaps, turned over to the decorators. We shall insist on premeditation and careful fundamental planning, knowing that therein lies the best, if not the only, hope of happy results. Once possessed of faith in that law of nature in accordance with which beauty springs from fitness, we shall be ready to agree that, when purpose is served, formal gardens, rectilinear avenues and courts of honor are not only permitted, but commanded. On the other hand, we shall be equally strenuous in demanding studied planning and adaptation to environment and purpose in the laying out of whatever work may need to be done to make the wildest place of private or public resort accessible and enjoyable. Positive injury to the landscape of such places can be avoided only by painstaking, while the available resources of scenery can be economized only by careful devising. So with the whole range of problems which lie between these extremes. No work of man is ever successfully accomplished without taking thought beforehand; in other words, without planning.

And, strange as it may appear, opposition to such planning for effective results will not, in practice, be found to come from those who attempt decoration only because they know not how else to attain to the beautiful. Just as the literary class in China ruinously opposes change of any kind, so there is with us a comparatively small, but influential, body of refined persons, far too well educated to be "deceived by ornament," who most unfortunately, though unintentionally, assist in the triumphs of ugliness by blindly opposing all attempts to adapt land and landscape to changed or new requirements. Enjoying the pleasant scenery of their surroundings as it exists—certain shady roads, or some lingering fields or farm-lands—these estimable people talk of "letting Nature alone" or "keeping Nature natural," as if such a thing were possible in a world which was made for man. No; the "moulding and altering" of the earth goes forward of necessity, and if those who ought to be leaders will not help to guide the work aright, the work will surely be done badly; as it is, in fact, done badly in the neighborhood of all our great towns. To refuse to exercise foresight and to adapt to purpose in due season, is simply to court disaster. Instead of hanging back, it ought to be the pride and pleasure of these very people to see to it that proper plans are seasonably laid for the widening of roads so that fine trees shall not be sacrificed, to see to it that electric-car tracks shall be placed only in suitably selected and specially arranged streets, that public reservations of one type or another shall be provided in accordance with some consistent general scheme, and that such reservations shall be saved from both decorative and haphazard development by the early adoption of rational and comprehensive plans. There is needed a little less selfish contentment in the the doomed landscape of the present, a sharper sense of responsibility to the future and a living faith in that law of God, in obedience to which everything which is well adapted to use and purpose is sure to be interesting and expressive, and if not beautiful, at least on the way to be.

Brookline, Mass.

Charles Eliot.

If you would make acquaintance with Ferns you must forget your science and approach them as something strange, and with no introduction from a learned man. Nothing is easier than to find out the position of the fruit dots, or the character of the indusium. But if you are to be affected by Ferns, if they are to amount to anything, signify anything to you, be another sacred scripture and revelation to you, helping to redeem your life, this end is not so easily accomplished.—*Thoreau.*

The Wild Gardens of the Sierra.

OUR California Sierra is five hundred miles long and seventy miles wide. The elevation is from 6,000 to nearly 15,000 feet. No great mountain range is more easy of access or better adapted to outdoor life. John Muir calls it not the Snowy Range, but the Range of Light, so marvelous are its sunbursts of morning, its clear noonday radiance from glacier-polished rocks and gleaming snows, its golden rivers of sunset, its alpine moonlights and star-lights, its glories of blossoms of every hue, but chiefly white, blue, scarlet, golden, and all sorts of clear, vivid colors.

Wonderful are the peaceful mountain lakelets that find places on no maps—pellucid, transparent, hidden in sheltered hollows of glacial valley-basins, at the tips of ancient moraines, or strung like beads on mountain streams, as in Lake Hollow in Tolumne Cañon, where ten such lakes lie close together. These snow-fed pools begin to throw off the chains of winter in May, June or July, according to the altitude, and then their margins suddenly run riot with a most bewildering variety and multitude of plants. Thousands of attractive lakelets exist in the Sierras; in the Merced district alone, Muir notes 131 of not less than five hundred yards in circuit; other thousands of hollows, once occupied by lakes, have now become green and blossoming meadows, while some are in the transition state—cold swamps where the *Droseras* grow, and one may look for *Darlingtonia*, or find in deeper channels the *Nuphar polysepalum*.

The margins of these countless lakelets are soft with Mosses, pale green *Hypnum*s, silky and lustrous *Dicranum*s, dark *Polytrichum*s and other Musci; green and purple *Sphagnum*s, slender, flat-branched *Selaginella*s, and a multitude of as delicate plant-carpetings. In such wet places rise the tall stems and graceful white perianths of *Spiranthes Romanzoffiana*, the Sierra Ladies' Tresses, with white and greenish *Habenarias*. Sometimes one finds the white-racemed *Hastingsia*, *Sagittaria variabilis*, or the *Damasonium Californicum* of Torrey, with many species of *Juncus* in the water edges. In a few cases, the ripe, salmon-colored capsules of the Bog *Asphodel*, *Narthecium*, gleam over the lesser water plants; and along the moister levels, whole acres of tall *Veratrum*s, or False Hellebore, uplift their broad leaves and heavy spikes of dull cream-colored and greenish flowers. Mingled with the Rushes are bright green Quillworts, *Iscetes*, and the cordate-leaved *Caltha leptosepala*. Every inch of ground is occupied with overflowing plant-life.

Bright-hued Mountain Grasses, *Stipas*, *Festucas*, *Trisetums*, *Bromi*, *Calamagrostes* and many more give soft hues of brown, purple and gold as they bloom and ripen on the sunny slopes or beside the blue lakelets. Beetles, ants, dragon-flies, *Vanessas*, *Papilio*s and many other species of butterflies in busy armies crawl and flutter through the warm summer land; mountain quail and grouse are in the thickets of dwarf Pines, Oaks, Poplars and Willows. Robins, swallows, grosbeaks and goldfinches are nesting or singing in tree-tops by rushing rivers and waterfalls; while the water ousel, swift bird-wonder, flashes through the spray, and the saucy Douglas squirrel, *Sciurus Douglasi*, makes a lively part of every scene.

But I have hardly begun to describe the variety of plant-life upon the shores of the lakelets in the alpine meadows and on the descending rock slopes. Around such lakes are vivid golden *Ranunculi* in many shades, *Ranunculus Andersonii*, *R. oxycotus*, *R. alismæfolius* and others; purple-beaked *Dodecatheons*, dwarf *Mimuli*, yellow or pink, with crimson-spotted or copper-red hoods; bee-haunted *Limnanthes*, white and pale yellow; rose-tinted *Claytonias*; tall, fragrant *Trifolium*s, red, white or purple-flowered, massed by dripping springs against still statelier *Aralias*, *Ferulas* and *Heracleums*, or grouped with white and yellow *Hosackias* by the edges of splintered granite rocks, while underfoot are nodding Pearlworts, modest little *Stel-*

larias and *Cerastium*s and the water-loving *Lobelia carnosula*. Creeping *Violas*, white, yellow and blue, are blossoming by thousands in the warm half-shade; under the trees one may at rare times find the delicate *Anemone multifida*; the *Aconitum Fischeri* lifts its pale blue flowers and pubescent stems through acres of orange-yellow and red-spotted Lilies, *L. pardalinum*, and near it is the pale lilac of *Clarkia rhomboidea*. By some of these alpine lakes the dwarf Willows are mingled with purple-flowering *Kalmias*, fringes of *Cassiope* and fragrant *Vaccinium*s, *Symphoricarpi* and *Loniceras*, which by September add their glowing white and orange-red berries to the reds and rose-purples of the dwarf Mountain Ribes.

If a mountain torrent falls into the lake hollow you shall find many *Saxifrages*, white, creamy brown or purple, hanging to the damp rocks. *Primula suffrutescens* will be there also, and where the spray dashes are white-blossoming *Rubus leucodermis*. On almost every sheltered, soil-covered shelf of rock millions of creamy yellow and purple-shaded *Erythronium*s begin to blossom as the snow melts and linger until the lake-shores fairly waken. Hidden at the bases of the crags are multitudes of *Asters* and *Aquilegias* (*A. truncata*), and if one climbs far enough he can find the large-flowered blue and white *A. coerulea*.

The blossoms of the hill-sides, ravines and rocks are so many and so varied that every cañon and lake-basin has its distinctive features, and a complete list would be merely a catalogue. Rose or flesh-colored *Dicentras* hide among the grasses; *Silenes*, pink, white, scarlet or purple, cluster about rock points; *Castillejas*, yellow-red and fire-tipped, deepening to almost crimson; vivid scarlet *Zauschnerias* and crowded glowing masses of blue *Lupines* illuminate the landscape; white and rose-colored *Phloxes*; *Pentstemon*s of pink, violet and blue; close-knit corymbs of rose-hued *Spiræas*; the almost prostrate, dense-clustered scorpioid spikes of *Spragueas*; silky, glistening cups of *Lewisia rediviva*—these, with an enormous number of wonderfully glowing *Compositæ*, clothe the dry, granite dust and furrows of the dark rocks. *Helianthi*, *Wyethias*, *Erigerons*, *Golden-rods*, *Heleniums*, and many others great and small, by lake-shores and streams and to the limits of alpine vegetation, mark the sway of the *Compositæ* in the Sierras. Often the color-scheme is strongly blue and gold for miles, for the tall Forget-me-nots, the lovely *Gentians*, such as *Gentiana Amarella*, *G. simplex* and *G. calycosa*, the fine alpine *Linums*, *Lupines*, Larkspurs and other vividly blue flowers quite hold their own with the rich *Compositæ*.

Especially brilliant, also, are some of the alpine *Ericaceæ*, such as *Bryanthus Breweri*, that dwarf evergreen with thick, obtuse, Heath-like leaves and saucer-shaped rose-purple blossoms gleaming upon high and rocky peaks of the Sierras. Another lovely Heath is the white or rose-colored *Cassiope*, a suffrutescent evergreen, with finely imbricated foliage. These grow far above the Oaks and the dwarf, trailing *Manzanitas*, where Hemlock Spruces, *Tsuga Pattoniana*, and mountain Pines, *Pinus albicaulis* and *P. monticola*, are the outposts of the great Sierra forests. Still one finds golden *Compositæ*, brighter and more luminous than ever, in great congregations close to the edges of the glaciers. Again, as far down by the lake hollows, the Mosses and other forms of lesser plant-life take the place of the glowing hosts of the mid-Sierra. The *Wood-sias* and larger Ferns disappear, but *Pellæas*, *Allosori*, *Cheilanthes* and *Cystopteris* have grown in the shadows of granite crags and in crevices of the giant mountains all the way from the land of Lilies, of wild Sierra Roses and of thickets of white-flowered *Prunus emarginata*. On the gray pinnacles, among sky-blue Flaxes, silvery *Astragali*, with cream-white and purple flowers and mottled pods, rattle sharply in the winds. Alpine Sages creep up from the Nevada desert plateau and make the eastern horizon gray. The blue and white *Polemoniums*, the hoary *Lithospermum pilosum* and other flowers of the highest peaks are found here in gardens of their own.

Niles, Calif.

Charles H. Shinn.

New or Little-known Plants.

Lonicera hirsuta.

THIS native twining high-climbing Honeysuckle (see illustration on this page), although now rarely seen in cultivation, is well suited to enliven the garden with its ample dark green foliage and terminal and axillary clusters of bright orange-colored hirsute fragrant flowers, which open in June, and in fading turn to dull purple or brown.

Lonicera hirsuta inhabits rocky banks or climbs over

With *Lonicera hirsuta* is grown in the Arnold Arboretum a climbing Honeysuckle (see illustration on page 345), which is intermediate between *Lonicera hirsuta* and *Lonicera Sullivantii* in the color and pubescence of the leaves and flowers, and may be a natural hybrid between these species. Nothing of its origin is known beyond the fact that it was raised from a cutting taken from a plant which long grew in the Harvard Botanic Garden at Cambridge. The specimen in the Arboretum is a vigorous plant with glabrous stems, light green leaves destitute of the bloom



Fig. 45.—*Lonicera hirsuta*.

bushes and fences, and is distributed from the province of Ontario along the northern shores of Lake Superior to the Saskatchewan, and southward to Pennsylvania and Michigan. In gardens it may be used to cover trellises and arbors, to grow over coarse shrubs and to climb into small trees; and as a garden plant it is superior to the much more commonly planted *Lonicera Sullivantii* (see GARDEN AND FOREST, vol. iii., p. 187, f. 34), which is a less vigorous plant and more frequently disfigured by insects and disease.

which distinguishes those of *Lonicera Sullivantii*, and pale and covered below with short pubescence, and orange-colored flowers slightly pubescent on the corolla-tubes. Although more vigorous in habit and general appearance, this plant resembles *Lonicera Sullivantii*, but the pubescence on the lower surface of the leaves and the color and pubescence of the flowers suggest a hybrid origin. The plant cultivated in the Botanic Garden of Copenhagen as *Lonicera media* (Coll. G. Nicholson, No. 4132) appears to be the same thing.

Foreign Correspondence

London Letter.

SWANLEY COLLEGE is a teaching school of horticulture for young men and women, most of whom are residential, the course of training being two or three years of practical horticulture combined with class-room work. Sir William

in the practical branch, for education nowadays was somewhat too bookish. Speaking of foreign competition he remarked that it was interesting to notice how foreigners were taught to use their hands. In the matter of railway work he had seen abroad men who were able to pack into three trucks the material which in Great Britain went into four; this, of course, resulted in a great saving of money.



Fig. 46.—*Lonicera hirsuta* × *Sullivanii*.—See page 344.

1. Flowering branch, natural size.

2. Flower of *L. hirsuta*, natural size.

3. Flower of hybrid, natural size.

4. Flower of *L. Sullivanii*, natural size.

Hart Dyke, Bart., M. P., who presided recently at the prize distribution among the students, said the college was absolutely unequaled in the educational system of the country, for it was the only school where the students, male and female, paid attention to both the practical and the theoretical side of horticulture. It was specially satisfactory to him to know that the governors took a deep interest

There were few pleasanter occupations than gardening; certainly it was a better way of obtaining a livelihood than by working in a mine or a factory, or sweating in some den. During the proceedings it was remarked that for every woman who had left the college a lucrative and satisfactory appointment had been found. It is well that attention should be called to the wisdom of practical teach-

ing, the tendency lately having been to set up a bookish knowledge of horticulture as preferable to that obtained by actual practice, on the assumption that the man who could talk or write about work was more likely to be a competent performer than the man who can work but cannot deliver orations or write essays about it.

ROYAL GARDENS, KEW.—The following paragraph has been published in *The Times* and other papers. It may be said to indicate unusual interest on the part of the general public in the work and development of Kew: "Some important alterations are now being carried out at Kew. The temperate house, projected by the late Prince Consort, was originally designed to comprise a central structure, two octagons and two wings. The wings were not added; but the Government has now granted the necessary funds, and already such progress has been made that the south wing is nearly completed, and the north wing will be constructed at the earliest possible date. When finished, the temperate house will be one of the most striking and probably the largest of the kind in existence. Its central avenue will be six hundred feet long, and there will be a clear view from end to end. This, it may be added, will be just double the length of the present largest house—the Palm house—in the gardens. The south wing will be used especially for the accommodation of succulent plants, Agaves, the taller Cacti, and the like, from such subtropical countries as the Cape, the highlands of Mexico, and the Canary Islands. Limited in the area of their growths, the plants have hitherto been necessarily confined in tubs, but in their new quarters they will be out in beds, where they may be expected to flower and add a new attraction to the Royal Gardens."

COÖPERATION AMONG GARDENERS AND FARMERS.—The British Produce Supply Association has been formed to encourage the cultivation of fruit, vegetables, etc., in the United Kingdom and assist in its distribution among consumers. Lord Winchilsea is the principal mover in the scheme, which already has made considerable progress toward organization. The scheme now includes not merely the existence of a central body in London for the collection and distribution of British produce, but the formation of a network of local associations throughout the United Kingdom, working in complete harmony with the central body in accordance with the general principles laid down, yet each having its own administration, and arranging, in turn, for the thorough organization of its own district. The first of these local bodies is now being formed in south Lincolnshire, with Sleaford as the centre, the idea being that, in the initial stage, operations shall be commenced in that county under the personal supervision of Lord Winchilsea, and a more or less perfect model secured, which can be copied in other counties afterward. Some little anxiety had been felt as to the actual extent to which the farmers and market growers themselves would support the movement, for while the £50,000 required to begin with by the central body in London has been readily subscribed by six hundred and fifty leading landowners in the country, it was felt that the success of the movement as a whole would largely depend upon the help given by the producers in the formation and carrying on of the local associations. The result shows that the scheme has been received with great favor in south Lincolnshire, where, indeed, there is hardly a cultivator of any standing at all who has not taken shares in the Sleaford association, and thus secured a personal interest in its future welfare.

THE ROYAL HORTICULTURAL SOCIETY is this year endeavoring to extend its influence to the provinces of England by means of deputations of representative horticulturists which attend plant exhibitions, where, by giving lectures, awarding prizes and in other ways showing an interest in the exhibits, they add to the importance of the occasion and give valuable assistance. Exhibitions at York and at Chester have already received this attention from what is now known as the "parent" society of horticulture. At Chester last week the President, Sir Trevor Lawrence, Dean Hole

and Mr. F. W. Burbidge were the principal representatives of the society, taking part in the conference by reading papers. That by Sir Trevor was on the History of the Royal Horticultural Society; Dean Hole discoursed humorously on Garden Craft, and Mr. Burbidge dealt with the Literature of Horticulture. The Dean was particularly happy in his gibes at the people who pretend to love horticulture, but neither know nor care anything about it. He also struck the right note when he warned gardeners against too great an anxiety to improve nature, such efforts too often ending in disfigurement or worse. Statues, mud-banks, stagnant pools and brickbats were also ridiculed as abominations in the garden.

IRON VERSUS WOOD FOR GREENHOUSES.—Some horticulturists, whom I think I may term old-fashioned, are prejudiced against the use of iron instead of wood in the construction of plant-houses because of the supposed coldness of the iron and its excessive contractility in cold weather. From actual experience, I should say there is practically nothing in this objection, and looking at the enormous difference between the amount of light possible in an iron structure compared with one of wood I should say that, bar expense, the argument is all in favor of iron. I have lately seen several large new conservatories which support this contention, those built of iron, or, better still, of cast-steel, being lighter, more elegant and horticulturally far superior to the wooden ones, although these latter are, according to the architect, as light as they can be with safety. An architect does not understand that every inch of opaque roof-surface is a loss to the plants, and that the most perfect roof for a plant-house, were it possible, would be one of entire transparency. Where wood is used on account of cheapness it should be reduced to the lowest possible minimum, the panes of glass being as wide and strong as possible. It should not be forgotten that stout glass is in itself a great stiffener in structure. The experience of horticulturists in your country ought to be of value, the extremes of temperature with you being a greater test than what we experience here.

BULB-FARMING IN SCILLY.—The small group of islands off the extreme point of Cornwall have lately become important horticulturally as sources of the best samples of Narcissi bulbs. Originally started with the object of growing forced Daffodils for the English market, the farmers soon found themselves overstocked with bulbs, but on marketing the bulbs the prices realized were so satisfactory that the bulbs are now looked upon as of greater importance than the flowers. The growers grade the bulbs annually, sending the largest and best to the bulb dealers, planting the second size for flowers and to grow on, while the small ones are put into the nursery-beds. English dealers prefer Daffodils from Scilly before those from Holland. Other bulbous plants besides Narcissi are being tried on the same lines. The development of this lucrative industry is due to the enterprise of T. A. Dorien-Smith, Esq., of Tresco Abbey, who devotes a considerable portion of land to experimental bulb-culture and invites his neighbors to copy his most successful efforts.

SOLANUM CERNUUM.—The August number of *The Botanical Magazine* contains a figure of this species, which, for some years, has been a conspicuous plant in the temperate house at Kew, under the synonymous name of *Solanum jubatum*. It has an erect, unbranched woody stem ten feet high, bearing a head of large spreading oblong leaves two feet by one and a half feet, dark green, leathery, silvery on the under side, and, when young, clothed on both sides with long brown scurf-like hairs, the petiole and stem being permanently clothed with similar hairs. The flowers, which are borne in short cernuous cymes about the bases of the leaf-stalks, are white, with yellow anthers, and on strong plants they are produced in sufficient abundance to make a good show. The principal value of the species, however, is as a striking foliage-plant for a cool greenhouse, its large, bold foliage and tree-like habit adapting it for large conservatories. It may be propagated from cut-

tings. So far as I know, Kew is the only garden where this *Solanum* is cultivated. It is a native of Rio and Minas Geraes.

London.

W. Watson.

Cultural Department.

Funkias.

THE genus *Funkia* is both handsome and useful, and will accommodate itself to almost any soil or situation. From early spring, when the young leaves are first developed above the ground, the plants are ornamental, and in midsummer they give a profusion of beautiful flowers. During the remaining part of the summer, after the blooming season is past, no plants in the garden have more ornamental foliage. They even vie with the best of tropical plants in this respect.

A few years ago I tried to induce good showy herbaceous plants to grow under the shade of some large old Hemlock-trees, but failed to establish any of the sorts tried. In another part of the garden I noticed some stray plants of *Funkias* growing luxuriantly under the shade of Maples, and soon after I planted the ground under the Hemlocks with several species of *Funkias*. They have been there for several years now, and have grown luxuriantly and flowered profusely every summer. The small-leaved kinds are desirable for edging large beds, while the large-leaved sorts should be grown where they are not crowded by other plants. In such a position a single plant will soon develop into a large handsome specimen four or five feet in diameter. All the species mentioned in these notes are perfectly hardy and need no protection whatever in winter. They are all herbaceous, and the best way to increase the plants is to divide them just before they begin to grow in the spring. I have transplanted plants in early summer when the leaves were full-grown, with success. If they are disturbed during the summer they ought to be taken up with a good ball of earth and plentifully watered.

The *Funkias*, or Plain-lilies, are liliaceous plants, and come into bloom just as the last of their near relatives, *Hemerocallis*, are passing out of flower. The specific names of the plants belonging to this genus are very much confused, perhaps owing to some of the species having so many different forms. After carefully comparing our plants with the specimens in the Gray Herbarium, the species in the genus can be reduced to about five, with a number of varieties.

Funkia lanceolata is the species with the narrowest leaves; they are green, five inches long, three inches across and lanceolate, tapering at both ends. The petioles are from ten to fourteen inches long and their edges are short and not incurved. The scapes of flowers are undeveloped, and are as yet hidden among the leaves on our plants; when they are fully grown they rise above the foliage in short racemes of ten or twelve flowers, each flower being in the axil of a bract; they will be in perfection next month. The perianth is of a lilac tinge and about one inch and a half long and trumpet-shaped. There are several good varieties of this species. The variety *albo-marginata*, as grown here, is a larger plant in all its parts than the species. Its leaves are seven inches long and three broad, and they are edged with a white line which is constant. Its petioles are more broad than those of the species and are broadly channeled. It blossoms earlier than the species, and the first flowers are beginning to open on our plants. *Undulata* is another variety grown here which has crisped variegated leaves, with large blotches of white. This variety is the first one to blossom here, and it has finished flowering. This plant and its varieties are natives of Japan, and the species was introduced from there in 1829.

Funkia ovata is a desirable plant, with handsome, dark green, shining ovate leaves, which make it pleasing even without its blossoms. The size of the leaves varies greatly on different plants. Some of our plants have leaves three inches broad and five inches in length, while others, although they are all grown near one another, have leaves over five inches in breadth and nine inches in length. The petiole of the leaf in this species varies in length from six to twelve inches, and is deeply channeled and the edges are not incurved. This species has been blossoming for the past three weeks. The scape is about a foot and a half in length, and the flowers are produced in racemes of fifteen to eighteen blossoms, which are held well above the foliage. The individual flowers are of good size, blue on the outside, the inside streaked with white. This species is a native of Japan, northern China and eastern Siberia, and was introduced from there a little over a century ago. It is figured in *The Botanical Magazine* under the name *Hemerocallis cœrulea*.

Another good species in bloom now is *Funkia Sieboldiana*. Its foliage is more handsome than that of the other species described; it is as easily grown as any and produces flowers freely. The elegant glaucous leaves are broadly cordate-ovate; they measure about seven inches in breadth and ten to twelve inches in length, and have petioles about a foot in length. The flowers are of a pleasing pale lilac color, and the racemes begin to open just above the foliage. This *Funkia* is also a native of Japan and was introduced from there in 1836. A variety of this plant grown here has yellow margined leaves and makes a desirable foliage plant.

Funkia subcordata blossoms a little later here than *F. Sieboldiana*. It has not quite as handsome foliage as some of the other *Funkias*, but what it lacks in foliage it makes up in beautiful flowers. It is a distinct plant; the leaves are pale green, ovate, with a cordate base; they are about five inches in breadth and eight inches in length. The petioles differ from those on any of the other species, their edges being incurved until they meet. The large white flowers are produced plentifully in good-sized racemes on well-established plants. This plant is quite a favorite in gardens in Cambridge, and is generally known as *F. grandiflora*.

Harvard University Botanic Garden.

Robert Cameron.

Autumn-flowering Bulbous Plants.

LYCORIS SQUAMIGERA is now finely in bloom here and also at the place of H. H. Hunnewell, Esq. There is now no doubt about the hardness of this beautiful Chinese *Amaryllid*. In its manner of growth it resembles the well-known *Belladonna Lily*, *Amaryllis Belladonna*. Each has a separate season for growth and blooming. The *Lycoris* makes its growth early in spring, throwing up its leaves before frosty weather leaves us. Its foliage never has been injured. The leaves disappear about the end of June, and the flowers appear during August. The flower-scapes are self-supporting, about two and a half feet in height, each carrying umbels of from seven to eight flowers. It is hard to describe the color exactly; in fact, there are several—four of them, at least—blending and fading as the flowers open and mature. Yellow and lavender show in the opening flowers; blue and salmon tints in the mature ones. The perianth lobes turn upward more than in the true *Amaryllis*, and there are other minor distinctive characters, but for practical purposes they are alike, and for gardening purposes they can hardly be separated.

Amaryllis Belladonna will be in bloom in a month or so. This species is tender. It commences its leaf-growth as soon as the flowers fade, in the same way as the *Nerines*. The leaves remain green until June, so that a longer period of rest intervenes between the maturing of the bulbs and blooming. Its handsome rosy pink flowers are larger than those of the *Lycoris*, but less erect in the umbels. In southern Europe the *Belladonna Lily* is hardy. With us it requires cool-greenhouse cultivation. The bulbs are best separated when at rest, the smaller bulbs being kept from the blooming ones. Good deep pans are preferable to pots. Rich loam, with a little charcoal, will be a good compost in which to grow the bulbs. Like all the *Amaryllis* family, they need repotting seldom. They will bloom on for years with only a top-dressing of fresh soil given just before the growing season.

Vallota purpurea, the Scarborough Lily, is also in bloom. This is another lovely autumn-blooming member of the *Amaryllis* family. It is a native of south Africa, and not unlike some of its allies, the *Hippeastrums* of the southern hemisphere of the New World. It is partly evergreen, and will not bear resting to the extent the deciduous bulbs will, though less water is required for a month or two prior to the blooming season. The flowers are crimson, borne in erect-flowered umbels about a foot high. *Nerine Fothergillii* and *N. Sarniensis*, the latter known as the Guernsey Lily, are charming south African members of the same family. The flowers are brilliant scarlet in the first-named; salmon-colored in the latter. The leaves appear before the flowers fade. They continue all winter, resting during the summer-time.

All these popular autumn-flowering bulbous plants are easily grown. Ordinary loam suits them well, and they seldom require potting. During the growing season abundance of water is required, and less when resting. They will go to rest and resume growth without special treatment. Though all, with the exception of the *Lycoris*, are tender, inasmuch as they will not bear more than a few degrees of frost, they are distinctly cool-house bulbs, and do best in a moderate temperature.

Montbretias are among our brightest autumn-blooming bulb-

ous plants suitable for border culture, and with the *Gladiolus*, *Tritomas* and *Galtonias* help to make the garden gay when summer-blooming plants are becoming ragged or are going to rest. The *Montbretias* may be conveniently described as miniature *Gladioli*, resembling them in the foliage, and also in the one-sided way of blossoming. The flowers, which are stellate rather than campanulate (as in the *Gladiolus*), are produced abundantly, and the bulbs increase rapidly, so that in gathering a bouquet we can afford to cut some to the ground, taking leaves as well. Used in this way they are serviceable for indoor decoration. *M. crocosmiaeflora* is the best known. It is a bigeneric hybrid between *M. Pottsii* and *Crocossia aurea*. There are besides several seedling forms which have received names. *M. Rayon d'Or* is yellow, flushed with red; *M. Gebe d'Or*, pure yellow, distinct and handsome.

Wellesley, Mass.

T. D. Hatfield.

Orchid Notes.

Rodriguezia pubescens.—This is one of the most beautiful of Orchids, considering the wealth of bloom produced from comparatively small plants; the sprays are long, arching gracefully, and the flowers are of the purest white, with a trace of yellow on the lip. This plant is not new, it having been well known at the time of its introduction, just fifty years ago, but like many other Orchids, as, for example, *Cattleya labiata*, it became scarce after a time, and not until the rediscovery of the *Cattleya* did this *Rodriguezia* appear again. Both Orchids come from the same part of Brazil, Pernambuco. Our plant, in a small pan, had twelve flower-spikes, and it was exceedingly pretty when in bloom, but owing, probably, to the intense heat at the time and the amount of moisture present in the atmosphere, the flowers only lasted a few days. They seem to be self-fertilizing, as a number of the caps containing the pollen were found on the bench under the plant, some at quite a distance, as though they were forced off by some mechanical means, such as those developed in *Catasetum* and other genera, and a day or two later many of the seed-vessels began to swell. The flowers were evidently impregnated without artificial aid, not common among Orchids, though there are well-known exceptions to the rule. It would be interesting to learn if other cultivators have had the same experience with this *Rodriguezia*, as I can find no record of this in any work to which I have access. We find it best grown in a pan or other open receptacle suspended in the warmest house; the roots are slender and seem to avoid the compost of living moss as much as possible, preferring to grow out and breathe in the moisture in the atmosphere. It was tried among the *Cattleyas* for a time, for we thought this ought to be the place for it, as it is found growing with them, but some of the young growths soon began to decay. It evidently was not warm enough there, so it was taken back to the warmer house, where it has prospered. When reintroduced into cultivation, like many more plants, it was thought to be new, and was named afresh *R. Lindeni*, but it was speedily located in published descriptions of the earlier part of the century, and will henceforth, no doubt, be often seen in gardens.

Cypripedium Thayerianum.—Horticulture is said to be progressive, and we venture to think that botany or botanical nomenclature is also, and if the attempts constantly made to classify and rearrange the work of the hybridist are to be taken seriously, ordinary cultivators will never be able to keep pace with the progress. *Cypripedium Boxalli* has for nineteen years been generally regarded as a well-marked variety of *C. villosum*. The flower is different structurally, and there appears to be no evidence of forms merging into the type species, but a late writer on the subject, Hansen, in *The Orchid Hybrids*, has suddenly decided that *C. Boxalli* must henceforth be considered the same as *C. villosum*, and a host of hybrids having the former for one parent must then be considered as synonyms, and cultivators will have to begin to learn over again the names of the plants they possess. *C. Thayerianum* is one of these; it is the result of a cross between *C. Lawrenceanum* and what is known as *C. Boxalli atratum*, a dark form, having the large flowers and rich wine coloring of *C. Lawrenceanum*, with the high polish of *C. Boxalli atratum* over the whole surface of the flower. Among hybrid *Cypripediums* it is considered one of the best, and it improves each year in size and coloring, is of healthy vigorous growth and was raised by the Messrs. Sander, of St. Albans, England. It remains to be seen whether Mr. Hansen's many innovations will be generally accepted by botanists, but from the cultivators' standpoint it will make confusion worse confounded. The above is only one of the many reforms suggested.

South Lancaster, Mass.

E. O. O.

Correspondence.

Two Good Trees for California Planting.

To the Editor of GARDEN AND FOREST:

Sir,—For the Pacific coast, I believe, there are no more valuable timber trees for cultivation than the common Locust, *Robinia Pseudacacia*, and Blackwood, *Acacia Melanoxylon*. Either, when planted in groves, will send up tall, shapely trunks that, under ordinary conditions, will grow to a diameter of eighteen inches in as many years.

The wood of the Locust has long been in demand for making trenails for ships and for wagon hubs, but it is little inferior to Hickory for any carriage work, and when freedom from decay is a prime requisite it is far superior. It is also excellent for tool-handles, and can be made into furniture of great strength and beauty. It takes a fine finish, as the grain is close and the color a pale yellow. For fence-posts it can hardly be excelled, its lasting qualities being equal to Cedar, but it is too valuable at present for such use. The rough portions and limbs make excellent fuel—equal to Beech and Sugar Maple. In short, there are few uses to which hardwood is put to which the Locust is not adapted. It may be well to say that here it is not afflicted by the borer that has worked such destruction in the western states.

The Blackwood has a more restricted field of usefulness than the Locust, but for certain things is the equal of any tree. There is no better tree for street purposes, and the wood is little inferior to Black Walnut for most uses to which the latter is adapted. It does not work so kindly, however, the grain being somewhat interlocked or "eaty," as it is technically termed; but for turned work in furniture, such as spindles and the like, and for balusters or grill work in house-finishing, nothing is better. And then for fuel it is the equal of any wood Hickory. Being an evergreen and a profuse bloomer in early spring this tree is desirable in many places where deciduous trees are not. At all times it is a pretty tree, with full, well-rounded top and dark shining lanceolate foliage that does not hold the dust so as to destroy its clean and refreshing appearance. It propagates readily from seed and transplants without difficulty.

Why these two valuable trees have not been more extensively grown has always been a mystery to me, especially when the country is dotted over with groves of the comparatively worthless Blue Gum, *Eucalyptus globulus*. Some day it will be different.

Fruitvale, Calif.

H. G. Pratt.

The Forest.

The Burma Teak Forests.—IV.

TIMBER OPERATIONS COMMENCED.

AS previously stated, Teak timber, in order to become fit for floating, must be killed by girdling, and the trees thus killed must be allowed to stand for two or three years after having been girdled. Under the working plan prepared in 1856, girdling operations commenced in 1857, and the trees that were girdled that year could not be floated and brought to market until 1860. Fortunately, however, I had found, in the forest districts explored by me, large quantities of dry timber, partly felled, partly standing, trees previously girdled or that had died from natural causes. Due notice had been given early to all those who had previously, under the king of Burma, worked the forests to remove their timber. When the time fixed by that notice had expired, the timber in the forests became the property of the Government. Considerable quantities of dry timber was thus available; by employing the people inhabiting the forests or living in the vicinity, I got this timber dragged to the water's edge and floated to the Rangoon timber depot, and by dealing with the Karens and Burmans direct, and not through middlemen, I was able at the outset to give them profitable employment, to make them my friends and allies and to enlist their interest in the protection of the forests. Most of the old timber in question was small and could be dragged by the cattle they had, by oxen and buffaloes, for in those days, with a few exceptions, these people owned no elephants. Gradually, as the work increased, I furnished them with funds to enable them to purchase elephants. In this manner the business extended, gradually but steadily. During the first four years, 1856-7 to 1859-60, mostly old timber was extracted, and only 16,000 tons a year were brought to market, the ton of Teak timber measuring fifty cubic feet. After that time, in consequence of the girdling operations which had been carried on regularly since 1857, the quantity

increased, and during the four years from 1860-1 to 1863-4 the average annual yield amounted to 29,000 tons. Ten years later, during the five years ending 1873-4, the mean yield had increased to 45,000, and twenty years later, during the five years ending 1893-4, to 68,000 tons a year. Altogether, under this system, one and a half million tons of Teak timber were extracted from the forests of British Burma during the thirty-eight years from 1856-7 to 1893-4. This result had been accomplished by girdling during the same period 660,000 trees. The whole of these 660,000 trees, and many more, were mature when operations were commenced by us.

FORESTS ORDERED TO BE THROWN OPEN TO PRIVATE ENTERPRISE.

Under the system which to this day regulates the operations of lumbermen in the United States, the whole of the mature trees which were standing in 1856 would have been girdled at once. Large quantities of timber would thus have been brought to market within a short period, instead of being spread over a long series of years. It has already been mentioned that Rangoon in those days had derived its importance mainly from the export of Teak timber and the shipbuilding trade carried on by means of the Teak timber brought from the forests. Teak at that time was the chief article upon which the prosperity of that town depended, for the export of rice, which since has given it a much greater importance, had at that time hardly begun. The merchants of Rangoon naturally desired to see their business increase rapidly, and as soon as they realized that the system introduced by me in 1856 would limit the quantity of Teak brought to market they commenced a vigorous opposition against it. Personally I made a point of keeping on good terms with them, and they tried hard to induce me to allow them to enter the forests and to cut the whole of the marketable trees. With much show of reason they contended that ships built of teak would soon be a thing of the past, that iron would, in shipbuilding as well as for all other purposes, replace the use of wood. Within a few years the demand for teak would diminish, prices would fall, and in the end teak would be a drug in the market and the Teak forests would be valueless.

At that time the Sepoy mutiny of 1857 had saddled the Government of India with an enormous debt, and the disturbed state of the country had considerably diminished the public revenue. Under these circumstances the merchants of Rangoon urged, as the only proper course, to take advantage of the high market rates for teak then ruling, and, by the sale to them of all mature timber standing in the forest, to realize large sums and thus immediately to produce a large revenue from the forests. More than this, they urged that a business transacted on so large a scale would give a great impulse to the prosperity of Rangoon. These considerations, they maintained, imperatively demanded the acceptance of their proposals. They appealed to my sense of duty toward the Government which I was serving, to my ambition and to my common sense, and they pictured in the darkest colors the disastrous consequences of a refusal to back their proposals. And with justice they added that they, the merchants, stood not alone in their views, but that these views were shared by the majority of the public officers and European residents of the province.

When my friends found that I remained firm, and that Major Phayre, the commissioner, refused to yield to their representations, they went to Calcutta, and backed by the influence of the large and powerful mercantile firms of Calcutta they succeeded in inducing the Government of India to order the commissioner to throw open the Pegu forests to private enterprise. The orders were sent to Rangoon in February, 1861. These orders had to be carried out, but, fortunately, we were not required to throw open the whole of the forests at once. By that time incessant hard work in examining the forests by means of linear valuation surveys and by constant height measurements, especially of the younger classes, had taught me which districts were valuable and which were less so. Those districts, therefore, in which the growing stock of teak timber in regard to height, quantity and distribution of age classes was most promising, were for a time retained under control of the Forest Department, while the rest were thrown open to private enterprise in accordance with the orders received. A large portion of these, the whole of the forests west of the Irawaddy River and others in Martaban, were let upon twelve years' leases, with the permission to girdle. In other districts permits in some cases for three, in others for six years were granted, under which the permit-holder, on payment of certain rates, became the proprietor of the timber extracted by him, being, however, limited in his operations to the timber girdled by the forest officers.

CHANGE OF FOREST POLICY OF GOVERNMENT.

Subsequently a different view of the question was taken by the Government; the arrangements which had been made could not, however, be canceled. The mischief had been done, but, fortunately, it had been limited to the less valuable districts. The really valuable forests, which in 1861 had been retained in the hands of the Government, had been saved, and this made it possible to maintain a good system of management. As regards those forests for which leases or permits had been granted, they were resumed when the term expired, and some of the permits had to be canceled sooner, because it was discovered that the agents of the permit-holder had illicitly girdled Teak on a very large scale.

The experience thus gained served to demonstrate the fallacy of the popular opinion which had been long maintained, and which had been defended with eloquent enthusiasm, that the management of the Burma forests could be safely left to private enterprise.

It will be remembered that the third of the great aims which I had proposed to myself in 1856 was as soon as possible to produce an annual surplus revenue. This, however, was more easily said than done. During the first two years the outlay necessarily greatly exceeded the income, and it was only in 1858-9 that the sales at the Rangoon timber depot yielded a large surplus, which, however, was barely sufficient to cover the deficit of the first two years. This result had been accomplished entirely by the sale of the old timber found in the forests when operations were commenced. As the fresh-girdled timber came in, after 1860, the surplus rose steadily. During the eleven years from 1868-9 to 1878-9 it amounted to 543,000 rupees a year on an average, while during the ten years from 1879-80 to 1888-9 it came on an average to 945,000 rupees a year, and during the five years ending with 1893-4 to 1,870,000 rupees.

Up to 1879-80 the whole of this surplus revenue was derived from Teak timber, the increase being due partly to the larger quantity and the better quality of the timber brought to market, partly to the gradual and, in spite of occasional fluctuations, fairly steady rise of prices. In 1856 the declared value of Teak timber exported from Rangoon was forty rupees a ton of fifty cubic feet, and during the five years ending in 1893-4 it fluctuated between seventy-two and eighty-two, being on an average seventy-five rupees.

OBSTRUCTIONS IN RIVERS CLEARED.

One important fact must here be noted, which has greatly aided the realization of a steadily increasing revenue. When I commenced work in 1856 I found that all Teak-producing tracts on the outskirts of the forests, and those in the hills which were near good floating streams, had been completely cleared out, the stumps alone of Teak-trees remaining with the half-burnt tops and branches of the trees. Large areas of Teak-producing forest, however, had, fortunately, been closed against the extraction of timber by obstructions in the rivers. These obstructions were of two classes. Some were caused by the silting up of mountain streams coming down from the hills with great velocity, carrying with them masses of sand silt and rubbish, which they deposited on entering the level country of the main valley. Some streams were more liable to silt up than others, and some of the richest Teak localities near the open country had been protected by such obstructions. In the majority of cases it was sufficient to clear the silt away, but in some it was necessary to dig canals in order to regulate the course of the river, and thus to open it for the floating of timber. The other class of obstructions was caused by bowlders and barriers of rock in the bed of the hill streams. A large extent of the most valuable Teak-producing tracts in the hills had on that account never been worked. Early on my first tour in 1856 I had discovered and examined some of the most formidable of these rocky obstructions in two large tributaries of the Sitang River and had explored the forests on the hills drained by these streams. I then had formed my plans for the removal of these obstructions, but at that time my position was not sufficiently secure to take action. Beginning with 1858, however, blasting parties were employed for the removal of these obstructions. Men trained to that kind of work not being available in Burma, parties of Coringa workmen were brought across the Bay of Bengal from the Coromandel coast to start the work. The undertaking was not an easy one. The places where the rocks had to be blasted were in the midst of the forest, far away from any village, difficult of access, in deep unhealthy valleys. Hence, after the Coringa men had done a few years' excellent work, the fever of the Burma jungles had decimated their ranks, and it became difficult to replace them by men from their own country. This

difficulty I had foreseen, and had associated with them a band of Red Karens, hardy, but most unruly, mountaineers, whom I had attached to me personally, who had been my most faithful followers and had enabled me to explore the forests rapidly and thoroughly. The Coringa blasters were Hindus, very skillful, intelligent and exceedingly cautious. With them no accident had ever occurred. The Red Karens, on the other hand, were impulsive, bold, but exceedingly careless, and severe accidents became numerous. However, the work went on, and is being continued year by year to this day, gunpowder having been replaced by dynamite. The number of these rocky obstructions was very large, but gradually they are all disappearing.

Bonn, Germany.

Dietrich Brandis.

Notes.

The Royal Gardens of Kew were visited by seventy-three thousand persons on the August bank holiday this year.

A plant of the Mammee Apple is now flowering for the first time in the economic house at Kew. The plant is ten feet high and in a large pot, and some of the flowers have set for fruits. Some of these immense fruits, which come from the West Indies, are now to be seen in our fancy-fruit stores.

According to *The Orchid Review*, Mr. H. T. Clinkaberry, gardener of C. G. Roebeling, Esq., of Trenton, New Jersey, has succeeded in raising some hybrid Vandas from seed. *V. tricolor* was taken as the seed parent and it was fertilized with pollen of *V. Sanderiana*. It is to be hoped that the plants will live to produce flowers.

The Gardeners' Chronicle speaks in high terms of the new hybrid Tea Rose, Marjorie, which strikingly resembles in color Margaret Dickson. The flower, however, is not so large, but has the advantage of being fuller in the centre and more compact, while the plant is of dwarfer habit and produces flowers at the end of every shoot. It was raised by Mr. Alexander Dickson, Newtownards.

At the recent Florists' Convention Mr. James Dean said that the new type of Canna, popularly called the Orchid Canna, of which Austria, Italia and Burbank were examples, had grown well with him when planted out, and, although they had burned some in the sun, he thought that under certain conditions they might succeed. As greenhouse plants, of course, they are magnificent.

Meehans' Monthly states that if Radish seed is sown in late September in a frame where the temperature is kept as much as ten or twelve degrees above the freezing point the roots will be large enough for use soon after Christmas. Of course, frost will not hurt them, but they will not grow unless the temperature is above the freezing point, and with care good, fresh radishes can be had in this way until spring.

Mr. Joseph Meehan calls attention to the fact that our native Asters, many of which are admirable plants for the autumn garden, will grow readily from seed. Gather the seeds from the plants of good species and varieties when they are ripe in the autumn and sow them at once, covering the bed with a light layer of forest leaves. Transplant the young seedlings next spring when they are large enough, and they will blossom the same year.

The ripened fruits of the Sassafras are not often seen upon the tree, for they are borne very sparingly as a rule, and eaten off by the birds. In particular years and places this fruit is very abundant, and when ripe at this season they are highly ornamental. In one of the parks above the Harlem in this city there is a fine tree, and the blue fruits, borne on fleshy pedicels, and thick calyx lobes of a deep rose color in abundant clusters are strikingly handsome as they appear among the rich green leaves.

Last week the receipts of California fruit were larger than they have ever been in this market for the same length of time, ninety-seven car-loads having been sold at auction. The weather has been favorable so that the fruit has not been hurried to its ripening, and the desirable varieties of prunes, plums, peaches and pears have brought fair prices. Worden and Niagara grapes of fair quality are now coming from the Hudson River Valley district, and among the apples from near-by points Alexander and Gravenstein are bringing the highest prices. Nectarines in the fancy-fruit stores are handsomer than usual and readily command \$1.00 a dozen.

A. L. Goldsborough, in *The Strawberry Culturist*, contends that the best time for transplanting Strawberries in his latitude is between August 15th and October 15th. The main expense

in Strawberry-culture is in weeding, and when planted in late summer or early autumn the ground can be entirely rid of these pests before the plants are set, whereas when they are set in spring it would be almost impossible to keep the weeds down. In a small garden two feet apart is wide enough for the rows. Any time after a rain young plants can be taken up and every portion of soil should be shaken from the roots to get rid of weed seeds and the eggs of insects. The ball of earth is a delusion. In straight rows, where plants have light and root-space without limit on two sides, four inches apart is ample.

Sometimes when the grade of streets or grounds is to be raised it is desirable to elevate the trees at the same time. Near Philadelphia, according to *Meehans' Monthly*, trees fifty feet high and with trunks eighteen inches in diameter are lifted with very little check to their growth in the following way: A trench is dug around a tree so as to leave a ball of earth, and when it is dug to the proper depth the earth is spaded from under the ball on one side and a block set under the roots as a fulcrum. Two guy ropes are then attached to the tree, one on the side where the block is set and the other opposite it. When the rope toward the block is drawn the tree is tilted and the mass of roots is lifted up on the opposite side. Earth is then packed under the elevated roots and then the rope on the side is drawn. This lifts the roots on the block side and more earth is placed there. In this way the tree by being swayed backward and forward, having earth thrust under it at each tilt, is soon elevated as many feet as is needed and stands on the summit of a firm mound of earth.

The forests of Russia, exclusive of those of central Asia, Caucasia and Finland, extend over a space of 478,000,000 acres, or about forty per cent. of the total area of the empire in Europe. This amounts to about five acres to each inhabitant, which might suffice to meet the requirements of the country in this respect if the ratio of the forest to the population were uniform. But in reality in the densely populated regions of southern Russia woodlands are scarce, while in the four most northern provinces there are nearly seventy acres of forest to each inhabitant. The disadvantages of this unequal disposition of the forest are aggravated by the immense distances which separate the thinly wooded districts of the south from the rich forests of the north, by the lack of water communication and the cost of carriage by rail. Plans for reforesting parts of the denuded area are therefore under consideration by the Government, and since private owners cannot be trusted to look forward to future supplies there is no doubt that the empire will assume the guardianship and administration of these forests.

In 1883 a disastrous eruption desolated the island of Krakatoa and left it covered with a layer of cinder and pumice-stone to a depth of three to one hundred and fifty feet, and this was so intensely hot that it destroyed all animal and vegetable life. Three years after the eruption the place was visited by Dr. Treub, whose observations are interesting, since they show how absolutely a barren island may become covered with vegetation. In writing of this incident, Mr. W. Botting Hemsley says in *Knowledge* that the island is about three miles across, with an altitude of 2,500 feet, one side presenting an almost perpendicular wall to the sea and the other sloping steeply. It is twenty miles from Sumatra, twenty-one from Java, and the nearest point where there is any vegetation is an island ten miles away. Cinders and pumice-stone are not fertile, but moisture and chemical action are helpful, and one class of plants prepared the way for higher ones. The first spores to germinate were those of filamentous algæ carried by the wind and sea, and caused a certain amount of disintegration. Individually the plants are microscopic, but they multiply enormously and form a green film-like tissue over the surfaces where they grow. The action of these organisms and their own decay form the medium in which the spores of Ferns brought by the wind germinated and developed, and Dr. Treub found eleven species of Fern, some of them already common. These prepared the soil for plants of a still more complex organization, and, although they were as yet rare, Dr. Treub found that fifteen species of flowering plants had already established themselves. These were partly sea-side plants whose seed had floated to the island, partly plants whose seed were dropped by birds or carried by the wind, since eight species were found on the mountainous interior of the island. Last year Dr. Treub visited Europe, and on his homeward voyage he passed within view of the island, which was then covered with vegetation. This is a most instructive lesson in the natural distribution of plants on account of its being the result of actual observation.

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The Spruce-trees of Eastern North America.

THE best descriptions and figures of the Spruce-trees which are indigenous in the eastern United States were published in London in 1803, in the first of Lambert's splendid folios devoted to the genus *Pinus*. Before the appearance of this work botanists referred all our Spruces to two species, the Black Spruce and the White Spruce, but Lambert, from material obtained in Newfoundland, recognized a third species which he called the Red Spruce. This species, however, has generally been neglected by botanists, who have either overlooked it entirely or have considered it a variety of the Black Spruce, although the late Dr. Lawson, of Halifax, who had exceptional opportunities for studying these trees in their native forests, insisted that the Red and Black Spruces were distinct trees, and his views will certainly be shared by every one who sees them alive and understands their distribution and peculiarities.

The Black Spruce, the *Picea nigra* or Mariana of botanists, is an inhabitant of cold, wet sphagnum swamps, where it rarely grows sixty feet high or lives a hundred years. It is a tree of open habit, with rather remote branches which sweep downward in slender, graceful curves. The slender branchlets are covered with fine rusty pubescence, and the leaves are blue-green and very glaucous. The cones are broadly ovate and from three-quarters of an inch to an inch and a quarter in length, with rigid scales conspicuously erose on the margins; they are strongly incurved at the base, dark purple when fully grown, and remain on the branches for many years. Trees stunted by wet and cold often begin to produce cones when only four or five feet high. The Black Spruce is common in Labrador and Newfoundland and ranges to Hudson's Bay and much farther north-westward, but probably does not reach the shores of the Pacific Ocean or as high latitudes as the White Spruce, although the confusion which has existed with regard to these trees makes it impossible to speak with confidence of their distribution in the Arctic Circle, or even on the waters of the upper Mackenzie River; it is common in the maritime provinces of Canada, following down the Atlantic coast to New Jersey, although south of Cape Ann it is not common in the coast region, being confined to a few isolated swamps; it ranges

westward to Manitoba and northern Minnesota, and southward to Pennsylvania, Michigan and Wisconsin, and is said to grow in elevated swamps on some of the high mountains of Virginia. The Black Spruce, however, is a rare tree on the Appalachian hills, although Black Spruces do occur on the White Mountains of New Hampshire and in several Pennsylvania swamps. It is, however, the only Black Spruce of the states surrounding the Great Lakes and the only Spruce which reaches the Atlantic coast south of Cape Ann. As a timber tree the Black Spruce has little value and probably has never been manufactured into lumber, except, perhaps, for local use. In cultivation it loses its beauty early, growing thin and straggly, and is one of the least desirable of all conifers as an ornamental tree.

The Red Spruce is a tree often one hundred feet and occasionally one hundred and twenty feet high, with a tall trunk three or four feet in diameter; short, slender, slightly pendulous branches which form a narrow, compact, pyramidal head; stout branchlets clothed with rusty pubescence and dark green lustrous leaves. The cones are oblong and from two inches to two inches and a half long, with thin, rigid, entire or obscurely erose scales, and are straight at the base, light green, sometimes slightly tinged or streaked with purple, and fall within a year after ripening. The Red Spruce grows in Labrador and Newfoundland; it occurs in the Canadian maritime provinces, although less commonly than the Black and White Spruces, and follows down the Atlantic coast to the neighborhood of Rockport, Massachusetts; it is the common Spruce-tree of all the interior regions of New England, New York and Pennsylvania, and ranges south along the Alleghany Mountains to the high peaks of North Carolina and Tennessee. As far as the United States is concerned, it is an Appalachian tree, and does not extend into the lake region. It is the upland Spruce of the northern states and the common timber Spruce of New England, New York and Pennsylvania, nearly all the spruce lumber of these states being obtained from this tree, which is the Black Spruce of lumbermen and most botanists.

The Red Spruce, which was formerly occasionally planted as an ornamental tree in New England, has generally escaped the notice of gardeners. In cultivation it is a beautiful long-lived tree of excellent color and habit, with the general appearance of the Oriental Spruce, *Picea orientalis*, which, in the northern states at least, does not surpass it in beauty, while it is less hardy and grows less rapidly.

The White Spruce, *Picea Canadensis*, differs from the Red and Black Spruces in its stouter, pale and glabrous branchlets and larger buds, in its bluer and more glaucous foliage, although on some Black Spruces the leaves are as glaucous as those of the White Spruce, and in the thin entire cone-scales, which are so flexible that a dry cone is easily compressed between the fingers, while the cones of the other species break under slight pressure. The strong, disagreeable, wildcat odor of the bruised leaves of the White Spruce distinguishes it from all other conifers, making it easy to recognize this tree at all seasons of the year. The White Spruce is common in Labrador and Newfoundland; it is probably the common Spruce of the subarctic and arctic forests which stretch across the continent, and appears to reach the eastern base of the Rocky Mountains of British Columbia, and possibly crosses their northern extension to the Pacific coast in Alaska; it is the common Spruce of the St. Lawrence valley, extending down the Atlantic coast at least to the shores of Casco Bay, in Maine, and in the interior it finds its southern home on the high mountains of northern New England and New York, northern Michigan, Wisconsin and Minnesota and the Black Hills of Dakota, where, apparently, it is the only Spruce-tree. The White Spruce is occasionally manufactured into lumber in northern New Hampshire and New York, although it is so rare in these regions that it cannot play an important part in the lumber supply; it is more abundant in Maine, and it is the principal timber Spruce in New Brunswick and the maritime provinces; and the wood of this tree is probably the only

Spruce lumber which has floated down the St. Lawrence and reached Europe from Canada.

As an ornamental tree the White Spruce is the best of the whole genus to plant in Canada and our northern states. Its value as an ornamental tree for the north is shown in Prince Edward Island, where rows of this tree have been planted by the roads crossing the island, or have been left standing when the forest-covering made way for tillage. These trees, which are often of great size, are perfect in form and color, with branches which often sweep the ground, and compact pyramidal heads. Cultivated in the northern states, the White Spruce flourishes as far south as southern New England, growing to a large size, retaining its lower branches and its dense habit for many years and displaying great variations of color. Farther south it is affected by heat, and often becomes disfigured by the attacks of red spiders. It is the best of all conifers for northern wind-breaks and hedges, and it is unfortunate that the Norway Spruce and other foreign trees of doubtful value in our climate have been allowed to supersede the White and Red Spruces in northern plantations.

Our illustration on page 355, from a photograph made by Dr. J. T. Rothrock on the Maine coast, gives an idea of the appearance of the White Spruce growing near the southern limits of its range and fully exposed to the fierce blasts of the Atlantic. These stunted wind-swept trees bear, however, little resemblance to the broad cones of verdure which under more favorable conditions the White Spruce raises to the height of more than a hundred feet.

Botanical Gardens.—I.

THE following is a portion of the Vice-Presidential address before the botanical section of the American Association for the Advancement of Science, delivered at Buffalo, New York, August 24th, 1896, by Professor N. L. Britton, the Director of the New York Botanical Garden. The paper will be concluded in our next number.

ORIGIN AND DEVELOPMENT.—The cultivation of plants within small areas for their healing qualities by the monks of the middle ages appears to have been the beginning of the modern botanical garden, although these mediæval gardens doubtless took their origin from others of greater antiquity. Botanical gardens were thus primarily formed for purely utilitarian objects, although the æsthetic study of planting and of flowers must doubtless have appealed to their owners and visitors. Their function as aids in scientific teaching and research, the one which at present furnishes the dominating reason for their existence, did not develop much, if any, before the sixteenth century, and prior to the middle of the seventeenth century a considerable number existed in Europe, in which this function was recognized to a greater or less degree, of which those at Bologna, Montpelier, Leyden, Paris and Upsala were, perhaps, the most noteworthy. The ornamental and decorative taste for planting had meanwhile been slowly gaining ground, as well as the desire to cultivate rare or unusual species, and during the eighteenth century attained a high degree of development. Many persons of wealth and influence fostered this taste, and became, through the employment of men skilled in botany and horticulture, generous patrons of science. The world was searched for new and rare plants, which were brought home to Europe for cultivation, and many sumptuous volumes, describing and delineating them, were published, mainly through the same patronage. The older gardens were essentially private institutions, but as the rights of the people became more and more recognized the many existing establishments and an increasing number of newly founded ones became, to a greater or less extent, open to the public, either through an admittance fee or without charge. The four main elements of the modern botanical garden have thus been brought into it successively: (1) The utilitarian or economic, (2) the æsthetic, (3) the scientific or biologic, (4) the philanthropic.

These four elements have been given different degrees of prominence, depending mainly upon local conditions, some gardens being essentially æsthetic, some mainly scientific, while in our public parks we find the philanthropic function as the underlying feature, usually accompanied by a touch of the æsthetic and scientific.

THE ECONOMIC ELEMENT.—In the broadest extension of this department of a botanical department there might be included, to advantage, facilities for the display and investigation of all plants directly or indirectly useful to man, and their products. This conception would include forestry, pharmacognosy, agriculture, pomology, pathology and organic chemistry, and, in case the management regards bacteria as plants, bacteriology.

The display of the plants may be effected by growing such of them as will exist without protection in the locality in a plot, more or less individualized, commonly known as the economic garden, while those too tender for cultivation in the open are grown in the greenhouses, either in a separate house or section, or scattered through the several houses or sections, in the temperatures best adapted to their growth. The display of plant products, best accompanied by mounted specimens of the species yielding them, by photographs and by plates, is accomplished by the economic museum, where these are arranged in glass or glass-fronted cases, suitably classified and labeled. It is believed that the most useful results are obtained by arranging this museum by the products themselves, and thus not in biologic sequence, but bringing together all drugs, all fibres, all woods, all resins; where the same product is used in more than one industry, the exhibit may be duplicated, more or less modified, without disadvantage.

The investigation of economic plants and their products is accomplished through the scientific department, and few valuable results can be reached unless the scientific equipment is well developed. The two departments must work conjointly, both on account of the necessity of knowing just what species is under investigation, its structure, distribution and literature, and in order that the most approved and exact methods may be used in the research. Any idea that the scientific element can be dispensed with in connection with economic studies is palpably untenable.

Teaching and research in agriculture, pomology and plant pathology are so well organized in America through our national Department of Agriculture and our numerous agricultural colleges and schools that there is no great necessity for providing elaborate equipments for these branches in botanical gardens. But in case the endowment of a garden were sufficiently large to enable them to be successfully prosecuted, in addition to their more necessary work, there can be no doubt that important additions to knowledge would be obtained. On the other hand, no such liberal allowances have been made with us for forestry or pharmacognosy, and research and instruction in these sciences must prove of the greatest benefit to the country.

THE ÆSTHETIC ELEMENT.—The buildings, roads, paths and planting of a botanical garden should be constructed and arranged with reference to tasteful and decorative landscape effect. The possibilities of treatment will depend largely upon the topographical character of the area selected and the natural vegetation of the tract. The buildings required are a fire-proof structure or structures for museums, herbarium, libraries, laboratories and offices; a glass house with compartments kept at several different temperatures for exhibition, propagation and experimentation, or several separate glass-houses; and to these will usually be added dwelling-houses for some of the officers, a stable and other minor buildings. The character, number and sizes of the buildings generally depend on financial considerations. In placing the structures intended for the visiting public, considerations of convenient access, satisfactory water-supply, and the distribution of crowds must be borne in mind, in connection with the landscape design. The planting should follow, as nearly as possible, a natural treatment, except immediately around the larger buildings and at the entrances, where considerable formality is desirable for architectural reasons. It is especially desirable that as much natural treatment as possible should be given to the areas devoted to systematic planting—herbaceous grounds, frutecetum, arboretum. The rectilinear arrangement of plant-beds found in most of the older gardens has become abhorrent to landscape lovers, and the sequence of families desired can usually be quite as well obtained by means of curved margined groups.

The cultivation of decorative plants, and especially the fostering of a taste for them, and the bringing of unusual or new species to attention and effecting their general introduction, are important functions of a botanical garden. For the accurate determination of these plants, information concerning their habits and structure, and suggestions regarding the conditions of their growth, the æsthetic side, must rely on the scientific.

THE SCIENTIFIC OR BIOLOGIC ELEMENT.—The important relations of the scientific department to the economic and

æsthetic have already been alluded to. The library, herbarium, museums and laboratories are the sources whence exact information regarding the name, structure, habits, life processes and products of plants are derived, and they are the more useful as they are the more complete and thoroughly equipped. It is practically impossible for any one library to have all the literature of botany and related sciences; any one herbarium to possess an authentic and complete representation of all species of plants; or any one museum to be thoroughly illustrative; absolute perfection along these lines cannot be obtained, but the more closely it is approximated the better the results. The research work of the scientific department should be organized along all lines of botanical inquiry, including taxonomy, morphology, anatomy, physiology and palæontology, and the laboratories should afford ample opportunities and equipment for their successful prosecution.

The arrangement of the areas devoted to systematic planting and the proper labeling of the species grown are important duties of the scientific department. The sequence of classes, orders and families is usually made to follow some "botanical system." It is highly desirable that this should be a system which indicates the natural relations of the families, as understood at the time the garden is laid out, and be elastic enough to admit of subsequent modification, as more exact information relative to these relationships is obtained. The weight of present opinion is overwhelmingly in favor of an arrangement from the more simple to the more complex, and this will apply not only to the systematic plantation, but to the systematic museum and the herbarium.

The scientific possibilities of a botanical garden are the greater if an organic or coöperative relationship exists between it and a university, thus affording ready facilities for information on other sciences.

THE PHILANTHROPIC ELEMENT.—A botanical garden operates as a valuable philanthropic agency, both directly and indirectly. Its direct influence lies through its affording an orderly arranged institution for the instruction, information and recreation of the people, and it is the more efficient for these purposes than a park, as it is the more completely developed and liberally maintained. Its indirect, but equally important, philanthropic operation is through the discovery and dissemination of facts concerning plants and their products, obtained through the studies of the scientific staff and by others using the scientific equipment.

NUMBER AND DISTRIBUTION OF BOTANICAL GARDENS.—There are somewhat over 200 institutions denominated botanical gardens, but only a few of them meet the requirements of the foregoing sketch. Some are essentially pleasure parks, with the plants more or less labeled; most of them pay some attention to taxonomy and morphology; many to economic botany, while a small number are admirably equipped in all branches of the science.

I have drawn freely on Professor Penhallow's first annual report of the Montreal Botanical Garden, published in 1886, for the following approximate statement of the number in different countries:

Algeria, 1; Australia, 3; Austro-Hungary, 13; Belgium, 5; Brazil, 2; Canada, 1; Canary Islands, 1; Cape of Good Hope, 3; Ceylon, 1; Chili, 1; China, 1; Cochin China, 1; Denmark, 2; Ecuador, 1; Egypt, 1; France, 22; Germany, 36; Great Britain and Ireland, 12; Greece, 1; Guatemala, 1; Guiana, 1; Holland, 4; India, 7; Italy, 23; Japan, 1; Java, 1; Malta, 1; Mauritius, 1; Natal, 1; New Zealand, 1; Norway, 1; Peru, 1; Philippine Islands, 1; Portugal, 3; Reunion, 1; Roumania, 2; Russia, 16; Servia, 1; Siberia, 1; Spain, 2; Straits Settlements, 1; Sweden, 6; Switzerland, 4; Tasmania, 1; United States, 10; West Indies, 6.

The Sand Dunes of Northern Indiana and their Flora.—I.

THE higher sand dunes by the south-eastern shore of Lake Michigan begin about twenty miles from Chicago and extend to Michigan City, forming a belt from one to three miles wide, which becomes narrower as it sweeps around the shores to the north-east. A spur runs westward from Millers, Indiana, and comes nearly up to the boundary of Illinois, making a narrow belt of sand hills, bordering the north side of the marshy tract through which the Calumet River sluggishly winds. Between this belt and the lake is a region of low sand ridges and sloughs, approximately parallel with the shore and the Calumet, which here drains an area once under the waters

of the lake. These ridges rise but a few feet above the lake-level, so that the region is swampy and has a flora differing from that of the higher dunes. The drier areas and narrow ridges form the Pine-barrens proper, in which the Gray Pine prevails.

The dune region is a confused mass of hills and hollows, the deeper depressions being shallow ponds. The features of this region have been shaped by two prevailing wind currents from the north-west and the south-west. The former predominates, and is most active in autumn and winter. Coming across the lake it takes up the sand washed ashore by the waves and drives it in upon the land, so that a severe storm from this quarter on the lake is accompanied by a corresponding storm of sand among the dunes, and the sharp particles are piled in drifts as fantastic in shape as those made by snow. This wind makes the principal ridges generally parallel with the shore. But winds from the west and south-west act upon these moving ridges and throw up others with an axis nearly north and south.

The shifting sands as they are blown along bury lower ridges and fill up hollows lying in their pathway. Their vegetation shares the same fate. Some have been so long undisturbed that Pine-trees thirty inches in diameter are found growing on the ridges. Those from six inches to a foot in diameter are seen on dunes quite near the shore. As some of the highest dunes rise from eighty to a hundred feet above the level of the lake, they are capable of covering trees of considerable height which may be growing in the hollows. This shifting of the sand in large masses is practically confined to a strip scarcely more than half a mile wide along the shore, for the greater part of the hills have been secured by the growth of vegetation. This capturing of the dunes must have begun upon their southern or eastern margin, or the old lake beach, and has worked its way toward the lake till it now holds the greater part of the area once covered by the waters of Lake Michigan when the land at its southern end stood at a lower level, and the discharge was south-westward to the Mississippi. The work went on till in places it has come close to the shore. But in the region of the higher dunes in this belt of shifting sands, though a dune may be captured and held for a long time, there is no permanent security. Where the winds have full sweep near the shore and fresh material is supplied by the sand constantly washed up by the waves, there is a tendency ever to beat back the vegetation. There is a ceaseless struggle between the opposing forces, sometimes one, sometimes the other, prevailing. It is plain to be seen that if the trees were removed from the dunes back from the shore they would in time be blown farther inland and encroach upon the arable ground. A belt of these sand hills, with their covering of vegetation, must be preserved as a screen, or artificial barriers will have to be provided. As they are of little account for tillage they are likely to remain, and however much of the sand may be taken away for filling and grading in swampy areas, the supply is so great and is so continuously renewed that it is practically inexhaustible. The greatest danger comes from fires, but they are guarded against more than formerly, even with the multiplication of railroads as a constant menace. Fortunately, also, the Oak-trees and many of the shrubs have roots or subterranean shoots which the fires do not reach, and they quickly renew themselves if their exposed parts have been destroyed.

The changes to which the dunes have been subjected at some period of their history help to explain one of the peculiar features of their flora and its mixed character. Plants are repeatedly found mingled with those naturally looked for in such localities that contravene our ideas of their adaptations to certain habitats currently accorded them in books, and generally in harmony with experience. Judged by such standards they are out of place. Doubtless some of these plants have a greater flexibility in adapting themselves to changed conditions than is usually granted them, but the principal reason for their presence in such places must be the supply of

those elements favorable to their growth. This becomes evident by the study of the formation of these sand hills. The burying of vegetation provides them with organic matter which more or less pervades them throughout. It is not abundant, but is enough to support the thin growth which covers them. At the time of the falling of the leaves in autumn or early winter we have a special lesson showing how vegetable matter is caught and preserved. Every bunch of grass or weed of any kind which the less active winds of summer have allowed to grow becomes a lodging place for leaves moving about with every breeze, and is soon surrounded by a ring of them. They are quickly loaded down by the shifting sand, to be buried with the plants which have caught them, or carried elsewhere along with the uprooted plants. This process annually repeated adds to the vegetable matter of the dunes, and sands which to the eye seem so purely silicious have more or less plant-food diffused among them. Where the vegetation has been undisturbed for a long time and the surface is well protected, a layer of vegetable mold two or three inches deep, mixed with some sand, accumulates, especially on the sheltered slopes and in the hollows. When such areas are near the shore they may be assailed by the wind and carried away, or the mold may be buried more or less deeply by the sand sifted in among the trees.

Nor are the dunes as devoid of moisture as would naturally be inferred. Their bases are saturated with water from the lake or from neighboring sloughs, and an unfailing supply is obtained for wells driven six or eight feet into the ground at this low level. This water comes to the surface of the hills by capillary action, and by digging down a foot or two the sand feels cool and moist. The roots of the plants not only run deep, but they are very finely divided and offer many points of contact with the soil. When the wind in destroying a dune exposes a section of its surface these roots are found to pervade the sand with a close, fine network, and are left as a dense fringe hanging from its upper edge. Some may be traced seven or eight feet vertically, though the stem of the plant itself rises but a foot or two above the surface of the ground. Some run a long distance horizontally. Those of *Artemisia* may be traced five feet or more in this way, though they become almost hair-like in diameter soon after leaving the main root. When the surface of the ground in places exposed to the direct rays of the sun becomes very warm the heat does not penetrate deeply, for much of it is reflected from the smooth surfaces of the particles of sand. Hence it is not common on the dunes to see plants drooping and withering even in quite dry weather. The earlier annual plants which have less depth of root are most likely to be affected. The supply of moisture from the base of the hills and from the vapors of the lake goes far toward counteracting droughts, so that in this respect the vegetation of the dunes is more favorably situated than that often growing on richer soil.

Chicago, Ill.

E. J. Hill.

Foreign Correspondence.

London Letter.

CATTLEYA HARDYANA.—This supposed natural hybrid between *Cattleya gigas* and *C. aurea* first flowered in England about ten years ago, when it was imported with *C. gigas*. It was named and figured by B. S. Williams in his *Orchid Album*, v., t. 231. It is by far the most beautiful of all the *Cattleyas* of the *labiata* group, and, notwithstanding a considerable range of variation revealed in the plants of it flowered in European collections, it continues to be one of the most highly prized, and, I might add, highly priced, of garden Orchids. The most beautiful form of it yet seen was sent to the last meeting of the Royal Horticultural Society by Baron Schroöder under the name of Clarke's variety, and was awarded a first-class certificate. The flowers are large, of a lustrous rose-purple color, the well-formed spreading lip rich maroon in front, crimson in the throat,

with deep yellow reticulating veins. A flower of an ordinary variety of *C. Hardyana* was shown with it for purposes of comparison. *C. gigas* is one of the noblest of *Cattleyas*, its only fault being a shy flowering nature. The form called *Sanderiana* or *imperialis* is the freest, and some of the latter so nearly resemble *C. Hardyana* that one feels disposed to look upon the latter as a sport simply from *C. gigas*.

SPATHOGLOTTIS PLICATA.—There are now three well-marked varieties of this Malayan ground-Orchid in cultivation, namely, the type which has leaves two feet or more long, a scape about a yard high bearing a short raceme of about a dozen flowers each an inch or so in diameter, the sepals and petals rose-purple and the long-clawed lip paler, with a yellow crest. The second is the white-flowered form called *alba*, of which the only plant I know is in the Kew collection. This differs from the first-named in having flowers with white segments and a yellow blotch on the lip. The third is a new introduction recently flowered in Messrs. Sander & Co.'s nursery at St. Albans. This is remarkable in having smaller leaves, a scape only a foot long and flowers half as large again as those of the type. It is named *Spathoglottis plicata*, var. *Micholitzii*, in compliment to the collector who found it in Perak. These plants grow best when suspended near the roof glass in a hot moist house, their pseudo-bulbs nestling in a light sandy compost and surrounded by sphagnum, which should be kept saturated all through the growing season. *S. aurea*, *S. Kimballiana* and *S. Wragi*, all first-rate East Indian Orchids, thrive under the same treatment.

NEW HYBRID ORCHIDS.—Among the new plants exhibited this week at the meeting of the Royal Horticultural Society the following hybrids deserve special mention: *Cypripedium Excelsior*, var. *Mars*, raised by Messrs. Sander & Co. from *C. Rothschildianum* and *C. Harrisianum*. It has a white dorsal sepal with purple lines, the petals drooping, greenish, with numerous black-purple spots and the pouch dark purple mixed with rosy lilac. *Lælio-Cattleya Seraph*, raised by Mr. C. L. Ingram, of Godalming, from *L. elegans* and *C. citrina*. It has short fusiform pseudo-bulbs, erect scapes and medium-sized flowers with spreading greenish yellow sepals and petals and a white and purple lip. The characters of *C. citrina* are not apparent in the hybrid. *Cattleya Marriottiana*, from Sir William Marriott, and said to be the result of a cross between *C. gigas* and *C. Eldorado*, does not differ appreciably from the last-named except in having smaller flowers. This cross would appear to be interesting as a case of reduction in size in all the vegetative characters of the two parents, an unusual occurrence in plant hybridization.

HARDY BAMBOOS.—A comprehensive collection of these plants from the nursery of Messrs. J. Veitch & Sons formed a special feature at the last meeting of the Royal Horticultural Society. This enterprising firm has not been slow to work up a stock of hardy Bamboos to meet the demand for them consequent upon the success of the experiments in their cultivation in the open air at Kew and the various books, papers and lectures specially devoted to them. Some of the species were awarded first-class certificates, notably *Bambusa palmata* and *B. Kumasaca*, two of the most distinct and attractive, the former being remarkable for the large size, thickness and rich green color of its evergreen leaves, borne on stems three to five feet high; the latter for its elegant habit, the stems being perfectly erect, two or three feet high, branched below and bearing ovate dark green leaves quite distinct in pose and outline from all other hardy Bamboos. The growth made by these plants this year under the influence of exceptional sunshine and heat has far surpassed anything done in previous seasons. The collection at Kew is now looking magnificent. It is difficult to overrate hardy Bamboos as effective shrubs for open-air gardening.

PHLOXES.—The herbaceous border or isolated bed on the lawn are beautiful at this season of the year with forms of *Phlox suffruticosa*, the parent of the popular garden *Phlox*.

Considerable improvement both in habit of growth and size and color of flowers has been made recently by breeders of Phloxes, the difference in these characters of newer sorts, compared with the old ones, being most marked. No floral picture in the open air surpasses a bed filled with the best varieties of Phlox, and no picture is more easily made. The plants are supplied small in pots for a few pence each in spring by Dobbie & Co., Rothesay; Lemoine, of Nancy, and other nurserymen who make a specialty of them, and these, if planted in well-manured soil in a sunny position, grow rapidly and flower freely the

series, has faith in old favorites, no nurserymen in England doing so much to keep them before the public or to revive a taste for them, should they have gone out of favor, as he. When Verbenas were neglected Mr. Cannell took them in hand and soon brought them into favor by means of wonderful exhibitions of their flowers at almost all times of the year. He has done equally valuable work with Zonal Pelargoniums, Primulas, Coleuses, Cannas, Dahlias and Begonias. Recently he has paid particular attention to Cockscombs, and his exhibition of them at the late meeting of the Royal Horticultural Society will, no doubt, cause



Fig. 47.—The White Spruce (*Picea alba*) on the Maine Coast.—See page 351.

first year. The stems should be staked early, otherwise they are apt to be twisted off by wind; they must also be watched against mice, which are fond of nibbling the bark off all round the base of the stems and so destroying them. The plants are at their best the second or third year after planting. A bed filled with one good variety, such as *Ætna* or *Coquelicot* (flame-red), or *Sylphide* or *Lawrence* (pure white), or *Carillon* or *Toreador* (beautiful clear pink), is most pleasing in effect and makes a display during the greater part of the summer.

COCKSCOMB CELOSIA.—Mr. Cannell, of the Swanley nur-

series, has faith in old favorites, no nurserymen in England doing so much to keep them before the public or to revive a taste for them, should they have gone out of favor, as he. When Verbenas were neglected Mr. Cannell took them in hand and soon brought them into favor by means of wonderful exhibitions of their flowers at almost all times of the year. He has done equally valuable work with Zonal Pelargoniums, Primulas, Coleuses, Cannas, Dahlias and Begonias. Recently he has paid particular attention to Cockscombs, and his exhibition of them at the late meeting of the Royal Horticultural Society will, no doubt, cause

London.

W. Watson.

Cultural Department.

The Osage Cantaloupe.

THIS is a product of accidental hybridization between the Banana Cantaloupe and the Jenny Lind, or one of the numerous netted Melons. Several hybrids of the Banana Melon have been produced; some like the Osage, others quite different. The Osage is a green Melon, with salmon-red flesh, a small cavity, a strong perfume; in some cases markedly ribbed, in others nearly smooth, and in others netted. Before it ripens it has an odor, and when it is ripe the peculiar characteristic perfume, like that of the Banana Melon, will fill a room. When fully ripe the flower-end becomes soft and is greenish yellow, and the same color prevails at the bottom of the grooves when decidedly ribbed. At the flower-end is the peculiar discoid mark so common in several well-known netted Melons. The flavor is excellent and closely resembles that of the Banana Cantaloupe when grown under favorable circumstances of soil, climate and season.

The Banana Cantaloupe is not a curiosity simply when well grown, but it so seldom is well-grown that it has been allowed to run out. Fruits of this variety have been produced which were three feet long and weighed seventeen pounds. I had one two feet long that produced an ounce of seeds and had no open cavity. A cross-section showed three narrow V-shaped fissures running through it, united at the central ends, and containing theseeds. The flavor was pronounced first-class.

The origin of the Osage was detected in the peculiar odor of the Melon, in its yellow ground-spot, in its yellow seeds, in its flavor and in its red flesh. One fruit showed its origin, as it presented the Banana Melon on the lower half, and the netted Melon on its upper. This hybrid is only partly settled as a distinctive variety, and still has a disposition to run into one or the other parent. The interior seems to be settled, but the exterior varies. In form it is round or oval, and weighs from four to eight pounds. Green Melons and red-fleshed ones are not popular. Netted and green-fleshed fruits are most so. The Jenny Lind Melon was called the "Centre Melon" sixty years ago, when the great Swedish singer was a little girl. It came from Asia Minor, and has been grown from half a pound to four pounds in weight. The highest bouquet is in the smallest fruits of a green interior.

My attention has been particularly directed to the Osage Melon of late because this is a bad Melon year, and the only good ones I have had have been of the Osage variety. I think the experiment of hybridization between the Osage and Jenny Lind, or Netted Gem, worth trying.

Philadelphia, Pa.

R. P. Harris.

The Chinese Hibiscus as a Lawn Plant.

HIBISCUS ROSA-SINENSIS and its many beautiful varieties have been utilized about the grounds of the executive mansion this year with fine effect. At the west end of the mansion, near the State, War and Navy Buildings, there are large groups of them associated with Japanese Maples and Bamboos. The Hibiscus plants are kept dormant all through the winter; if kept dry in the fall they lose their leaves during the winter months and they are easily carried over in a structure the temperature of which is just high enough to keep out the frost. In the spring, if it is necessary, the plants are shifted into larger tubs or pots and simply plunged in the ground where it is intended they should remain during the summer; this is a much better way to treat old plants, for when they are planted out they make too much growth at the expense of a rich display of flowers, but when young plants are wanted to grow rapidly into specimens they make very quick progress when they have unlimited root room. The best time to propagate is in the fall after the new wood is ripe; take the ends of the shoots from four to six inches in length for the cuttings, after they are well rooted, pot in three-inch pots, shift into fives in the spring, say about the beginning of May, plunge in an open frame; by the beginning of August they will be ready for a shift into eight or ten inch pots, and the growth they will make before cold weather sets in will bring them to a height of about three feet, with nice bushy heads. The following summer they will make very ornamental plants for the lawn or for planting in beds.

There are numerous varieties, differing from each other chiefly in the color of the flowers. The double-flowered kinds are not so free-flowering, neither are they as strong-growing as the single-flowering varieties; the individual flowers, however, last a much longer time in bloom than the single ones. The variety *grandiflorus* has a fine bold light crimson flower, and

is a free bloomer. The under surfaces of the petals are much lighter in color; on one side they are marbled with a creamy white color. The leaves are small, sometimes deeply cut and toothed. *Brilliantissimus* has quite large heart-shaped leaves, very regularly toothed; the flowers are of a brilliant crimson, the under surfaces being very little lighter, shining near the base. The petals after the first day or so are a trifle reflexed; this is the best of the single varieties. The variety *rubra plena* has very double flowers, the outer petals reflexed to such an extent as to form a ball; in color it is intermediate between *grandiflorus* and *brilliantissimus*. *Lucien Linden* has double flowers, but they are small and badly shaped, the color yellowish white and pale crimson, the latter color predominating. *Calleri* has double, buff-yellow flowers, probably the easiest to manage of the doubles. *Luteolus plenus* has light yellow flowers; the bases of the petals are deep scarlet. There are numerous other forms, but those given above are the most distinct.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Water-lilies and Extreme Heat.

EUROPEANS who have noticed the good qualities of *Nymphæas* that have been enhanced by the almost tropical weather experienced this season, are better able to judge of our superior advantages under which we can cultivate all varieties of *Nymphæas*, especially the tropical varieties, as well as the different varieties of *Nelumbiums* in the open air. What Mr. W. Watson says of the new forms of red hardy *Nymphæas* (page 334), that they improve under extreme heat, is equally true in the United States, only more so, but this does not hold good of other forms of red or pink Water-lilies. During the past heated term *Nymphæa Marliacea rosea* and *N. Marliacea carnea* depreciated very much in size and color, the flowers of the former not being so good as those of the latter in its best form, and produced very sparingly. The same remarks apply to our native pink forms of Water-lilies, *N. odorata rosea*, and *Caroliniana* and *exquisita*, as well as *N. tuberosa rosea*; the flowers were smaller, lighter in color and the sepals occasionally sunburnt, consequently the flowers were somewhat deformed. *Marliac's Chromatella* and *N. odorata sulphurea* depreciated only in size; the color was extremely rich. All varieties of hardy white Water-lilies decreased in size and quantity of bloom likewise. It is cheering to note the marked difference with all the above-mentioned Lilies after a week of normal weather. The pink varieties have improved in color, and all are improving in size and quantity of flowers. An exception must be made with *N. odorata rosea*; this may be attributed to the crop of seed just ripening, as it produces seed freely, and while a plant is bearing a crop of fruit it can hardly be expected to continue its production of choice flowers at the same time. The tropical weather experienced here early in August had a marked effect on all the tender *Nymphæas*; they grew luxuriantly and produced most charming flowers of more intense coloring than I have noticed before, nor did they lack in size or numbers. *Victoria regia* made remarkable growth, producing three leaves and four flowers in seven days. *Nelumbiums* also made remarkable growth and flowers.

Though we do not always experience so long a heated term so that the temperature of the water rises to one hundred degrees, yet, as a rule, our summers are hot, and during the height of the season the hardy varieties of Water-lilies deteriorate more or less according to location. The fact is patent, that the tender varieties are well adapted to our summer seasons and are indispensable for water gardens. They are as easy of culture as any of the hardy kinds, grow more luxuriantly, flower profusely, do not suffer through extreme heat and continue to blossom until cut down by frost. The color of the flowers is not equaled by the hardy varieties, and another point in their favor is that they are within the reach of all, as they can be purchased at a very low price compared with some of the hardy kinds.

Riverton, N. J.

Wm. Tricker.

Ornamental Grasses.

THE value of *Arundos*, *Miscanthus* (*Eulalias*) and *Erianthus* as decorative plants in the garden, and of their plumes for cutting, is well known; but aside from these there are a number of annual and dwarf perennial kinds whose flowers are particularly graceful and useful, either in making bouquets of themselves, or in giving to other flowers that lightness and gracefulness so necessary to well-arranged vases of flowers.

We reserve one border entirely for them, and have this

year some twenty-five species. We sow the seeds the second week in April rather thickly in four-inch pots placed on a gentle hot-bed. The seed germinates in a few days, and by the time the weather is fit for planting out the Grasses will be about two inches high. We then split up each species into eight or more little clumps, and plant them about ten inches apart so that each species forms a small square. I find this way of raising Grasses far more reliable and easier than sowing the seed in the open border. A collection of these Grasses may be obtained from any reliable seedsman.

Of the species which have flowered in our border thus far this season I find the following to be of especial value:

Agrostis nebulosa, an annual growing about eighteen inches high, with panicles of extreme fineness; in fact, one could hardly imagine anything more delicate and airy. It is commonly called "Cloud Grass." Nicholson's *Dictionary of Gardening* describes this species as "panicles resemble, when developed, a cloud resting over the ground." *Bromus brizæformis*, an elegant species growing about two feet high, with panicles of drooping spikelets, each spikelet measuring three-quarters of an inch long by half an inch wide. *Briza gracilis*, a low-growing Grass with panicles of small triangular spikelets. This species is commonly called the "Little Quaking Grass." *Coix Lachryma*, growing to a height of three feet. The flowers are borne in axillary pendulous racemes, and are more curious, perhaps, than pretty, but the leaves, which are one foot long by one inch wide, are particularly graceful. The seeds of this species are large and round, very unlike Grass seeds in general. The common name of this species is "Job's Tears." *Phalaris paradoxa*, an annual growing about two feet high, with flowers arranged in a close spike resembling the Fox-tail Grass. *Paspalum elegans*, a beautiful species growing about three feet high. The flowers are in close terminal panicles and are of a beautiful silvery gray color. The leaves are about four inches long by one wide. *Panicum virgatum*, a perennial species, about four feet high, with very large terminal panicles of flowers of a reddish brown color. The leaves are from one to two feet long by half an inch wide. *Avena sterilis*, growing about three feet in height. The flowers are in large spikelets, arranged in drooping panicles, and are very handsome. The common name of this species is "Animated Oats." It is an annual and a native of Barbary. *Pennisetum longistylum*, no doubt the best of all the spike-flowered Grasses. The spikes are some five inches long, and the long styles make them very beautiful. It grows about three feet high and the leaves are long and narrow.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Fancy-leaved Caladiums.—The collection of these plants at the nurseries of John Saul fills three good-sized houses. The number of kinds grown is somewhere in the neighborhood of three hundred; most of the varieties have been imported directly from Brazil; many of them are very distinct. While most of them are highly colored, slow to grow and increase, there are a great many kinds which make splendid specimen plants for the greenhouse, and there are quite a number useful for the decoration of the summer garden. Those kinds which, from their appearance, are likely to be of use for summer planting out-of-doors are carefully tested in the open ground; one of the best for this purpose is named *Cataguzes*. When full grown it is about three feet high, the leaves are green on the outer edges, the centres are white and spotted all over with large pinkish white blotches. *Pentado* has greenish yellow leaves spotted thickly with pink and white; this variety is only good for the greenhouse; it is slow-growing, but very showy. *Baron de Mamore* has blood-red veins, the remaining part of the leaf being thickly mottled with white; a splendid variety either for pot-culture or for bedding out. *Carolina* has leaves light green at the margins, pink centre bordered with white; good for pot-culture only. *J. C. Schmidt* has dark metallic foliage; the principal veins are deep pink. *Capivari* has green leaves blotched with white and pink; good for outdoors. *Jurana* has heart-shaped leaves with green margins, bright pink centres, but is of no use outside. *E. G. Henderson* is a variety with an uneven leaf-surface, pink veins and pink blotches on a green ground; a very good bedder. *Ludemannii* has pink centre, green, blotched with white; good out-of-doors. *Diana* is after the style of the well-known *Triomphe de l'Exposition*, the foliage being somewhat paler than that grand variety. *Candidum* is probably the best of the light-colored ones. In *Baron de Rothschild* the principal veins are very deep red, with the same color in blotches all over the leaf; it is one of the best kinds for pot-work. It is found to be a trifle more difficult to keep those highly colored kinds over

winter than it is to keep the more robust sorts; the safest way is to put the tubers either in dry sand or sawdust and keep in a warm dry place.

Botanic Garden, Washington, D. C.

G. W. O.

Correspondence.

To Protect the Beauty of the Woods.

To the Editor of GARDEN AND FOREST:

Sir,—It may not be generally realized that scientific forestry, though of inestimable value to a growing country, may in time despoil the woodland scenery of much of its highest charm. It is so, what is the remedy? It seems to me that it might be desirable to include in the prospective managing boards of our forest interests, whether state or national, some person or persons whose influence should count for the æsthetic value of our forests. In such a staff of directors, for instance, as was proposed by Mr. Judson N. Cross, of Minneapolis, in his scheme for restoring and preserving the Minnesota woods (see page 181), might it not be proper under these conditions to include some authority on art—somebody with a recognized understanding and appreciation of the beautiful in Nature?

When I say that scientific forestry tends to mar the beauty of woodland scenery, I refer to the changes in outward appearance that natural forests undergo as a result of some of the methods prescribed by scientific forestry. On the whole, such forests in time assume a strikingly artificial look. They show the evidence of man's handling and interference for some purpose. The trees, where planted or systematically sown, stand in monotonous rows or squares. The transition from undergrowth to standing forest is often abrupt and unpleasant. Again, there is not infrequently a systematic lopping of the lower branches, through which the crowns of the trees are raised to an awkward and unnatural height. At a distance the artificiality of such woods is still more obtrusive. They are apt to look patched and pieced together, incongruous in outline and form of surface and discordant in combination of color. An irregular stripe of young Beeches, for instance, may be followed by a patch of full-grown Pines, and this in turn by a bare spot ready for an aftergrowth. As a rule, there is wanting that graceful outline, soft blending of shades and fitness in detail that Nature, left to herself, so well knows how to produce.

In detailing these effects of scientific forestry I have only tried to show that scientific forestry methods do, in fact, influence undesirably the outward appearance of forests. The effects I have spoken of are mostly the results of important principles of forestry and cannot be sweepingly removed. And yet something may, perhaps, be done to mitigate their effect. It is plain, of course, that, on the whole, forestry must be allowed free scope. It should be remembered, however, that forestry is an art as well as a science, and that, according to the conditions of soil, climate, and so forth, cases may arise where one method would serve nearly as well as another. If in some way the primeval aspect of a characteristic bit of scenery might be preserved without seriously departing from the main principles of the best forest practice, might not such a departure be justified? I have in mind a part of the woods belonging to the city of Stuttgart, Wuertemberg, which lie several miles from the city on a hill. In this case an order was given several years ago that these woods should at no time be cleared, like the surrounding forest, but that reforestation should be effected through natural seeding or planting under, in order that the dense beauty of the green forest might stand uninterruptedly an agreeable sight to the citizens. We may, perhaps, assume, or, at least, hope, that our system of forest management will be more pliable and elastic than forestry systems of European countries, because our civil institutions are less rigid and bureaucratic than theirs; which leads me to believe that instances like the one I have cited might with us be made of still wider application. It is even conceivable that special cases might arise where the exceptional beauty of the landscape might warrant an entire subordination to it of the question of material gain aimed at by forestry.

Aside from this, the critic I have proposed could exercise his powers in certain other specific ways. He could, for instance, select exceptionally beautiful or otherwise remarkable individual trees for special protection and preservation. It occurs to me that the selection of wooded areas for "County Parks," as they were described in your editorial article for June 3d, might likewise be entrusted to his care.

In this way it would be possible to retain something of the

pristine beauty of our scenery, and some of the best influences of Nature, so constantly threatened in various ways by "progress and civilization," might be preserved.

Nuenden, Germany.

G. F. Schwarz.

The Massing of Wild Flowers.

To the Editor of GARDEN AND FOREST:

Sir,—Public parks and extensive private grounds have more to do in moulding public opinion in horticultural matters than all the learned works of floriculturists or landscape-gardeners. Theirs is an illustration that he who runs may read. Their mistakes and their successes are patterned after on every hand. Because of this it is a pleasure to note that those with roomy grounds are beginning to look to our native shrubs, vines and flowers for a part of their planting.

As yet there is one fault to be found with nearly all of these trials. They rarely show the breadth and plenitude of Nature at her best. There is a narrowness of scope, a paucity of effect, the more noticeable that it is in direct conflict with the teachings of Nature. It is true that around our villages and in long-settled portions of our country desirable native plants are scattered, and found mostly as single specimens. How could it be otherwise when efforts to exterminate them have been going on for years unchecked? But away from the homes of men and the haunts of cattle the scene is changed. Dame Nature scorns the puny achievements of the modern gardener. Look over the unbroken expanse of a wild prairie in June and July, and you will see acres upon acres, one vast sea of flowers. I have myself seen on a western plain hundreds of acres, one waving sea of Phlox in billows of white, mauve, pink and crimson, dashed with the flame of thousands of wild red Lilies. The finest park can show nothing as grand or as impressive.

While such a display of this is beyond the power of man to obtain, there are numberless other examples of Nature's uses of wild flowers that may readily be adapted to extensive pleasure-grounds. A low strip of ground, perhaps a quarter of an acre, completely carpeted with sky-blue *Houstonia cœrulea*, is one such object-lesson; a tiny rivulet flowing between banks thickly fringed with *Lobelia cardinalis* and *L. syphilitica* in vivid spikes of scarlet and blue, is another, and a solid mass of *Cypripedium spectabile* filling a little wooded dell with rank, lush growth, a hundred of its royal banner-like blooms in flower at one time, is yet another example of Nature's lavish massing.

It is not a difficult matter to secure these wild-flower carpets. First choose a judicious location and favorable soil, then dot here and there plants such as you wish to occupy the ground. Let them seed and spread after their own fashion, and in a few years they will have taken complete possession of the plot. Here at Oak Lawn we have found, to our cost, that some wild flowers will not only fulfill this mission of carpet-bedding, but will invade the regular precincts of the formal flower garden if not persistently weeded out. *Conoclinium cœlestinum* and *Verbena aubletia* are especial nuisances, the wind taking their light seeds and carrying them here, there and everywhere. *Sabbatias*, native *Irises*, *Agaves*, *Phloxes*, *Violets* and *Dodecatheons* are more satisfactory, forming well-defined clumps or masses, but not spreading beyond bounds.

Pineville, Mo.

Lora S. La Mance.

Notes from Germantown, Pennsylvania.

To the Editor of GARDEN AND FOREST:

Sir,—Few shrubs make a handsomer display in late August than the chaste tree *Vitex Agnus-castus*. There are three varieties with white, blue and lilac-purple flowers, respectively, borne on spikes about six inches long, produced on the ends of shoots of the present season's growth. The scarcity of shrubs with blue flowers makes the variety of this color most desirable, perhaps. This shrub gets partly winter-killed with us, but this does not hurt it in the slightest. On the contrary, the shoots seem to start more vigorously from the base and give finer flowers than they otherwise would. Where it does not partly winter-kill it would be best to prune it back well in spring, as is done with *Hydrangea paniculata grandiflora*. There is a species from northern China, *Vitex incisa*, which is said to be hardy in New England.

The pink cones on many *Magnolias* are both interesting and beautiful at this season of the year. *M. tripetala* makes the best display of any species, the pods being of good size and rosy pink in color. The Japanese *M. hypoleuca* has larger pods, being six inches in length on small trees, but the color is not as bright as those on our native tree. *Magnolias* are

worth planting for the beauty of their fruit alone, for certainly at this season of the year no trees are more ornamental than these.

The Crape Myrtle, *Lagerstrœmia Indica*, though its tops get winter-killed here in severe winters while the plant is young, is able to withstand the cold when well established. The common pink one is now in bloom about Germantown, and the specimens draw the attention of every passer-by. The varieties with white and with crimson flowers seem quite as hardy.

Germantown, Pa.

Joseph Meehan.

The Forest.

The Burma Teak Forests.—V.

REVENUE DERIVED FROM OTHER KINDS OF TIMBER.

THE removal of these obstructions placed at my disposal a large extent of good Teak localities that had never been touched by the axe of the lumberman, and fortunately the existence of this wealth of growing timber was unknown to my friends, the merchants of Rangoon.

It has already been stated that up to 1879-80 nearly the whole surplus revenue was derived from the sale of Teak timber. In 1860, however, as soon as the financial success of forest administration in these provinces had been secured, large quantities of other woods, not teak, sound, carefully selected pieces of those kinds which were likely to prove useful, were brought down from the forests to Rangoon. At the monthly sales these timbers were sold at the Government timber depot with the view of bringing other kinds of timber to public notice. At that time these operations yielded no profit, nor was this anticipated. They cost a good deal of money, but the object I had in view was attained. A demand gradually sprang up for several kinds, and among others one kind, *Pentace Burmanica*, a Tiliaceous tree, formerly quite unknown to trade, was discovered to be useful for tea boxes and furniture. After I had left Burma in 1862 these operations were discontinued for some time; they were, however, afterward resumed and yielded a small surplus of 30,000 rupees a year on an average during the three years ending with 1878-9.

As population increased in Burma, and as cultivation extended, the trade in other kinds of timber and bamboos increased considerably. Outside the demarcated reserves the cutting of other trees, not Teak, is and always has been free for the extension of cultivation as well as for the domestic and agricultural requirements of the people residing within a certain distance, usually five miles from the forests. Timber and bamboos exported for trade, or used for the manufacture of cutch (the extract of the heart-wood of *Acacia Catechu*, an excellent material for tanning), are paid for at fixed rates. From the demarcated reserves bamboos and timber of other kinds are exported under special arrangements. But, as already mentioned, the total revenue derived from bamboos and woods of other kinds forms a small proportion only of the total surplus forest revenue.

YIELD OF TIMBER AND REVENUE.

The result of working the forests of lower Burma, under the system commenced in 1856, will be better understood by a glance at the following figures, exhibiting for five unequal periods, during the thirty-eight years from 1856 to 1893, the number of trees girdled, the timber extracted from the forests and the net revenue realized. In 1886 the kingdom of upper Burma was annexed to the British Indian Empire. The present figures relate to lower Burma only, that is to those provinces which in 1856 were known as Pegu, Martaban and Tenasserim, and which, with Arakan, were until 1886 known under the designation of British Burma:

Periods.	Trees girdled annually.	Timber extracted annually. 1 ton = 50 cub. ft.	Annual net revenue. Rupees.
12 years, '56-'57 to '67-'68,	24,300	25,200	208,000
11 " '68-'69 " '78-'79,	7,900	45,400	542,900
10 " '79-'80 " '88-'89,	18,000	38,700	945,000
5 " '89-'90 " '93-'94,	20,300	68,000	1,870,000

The system of girdling the trees several years before they are cut has this effect, that the girdled timber constitutes, as it were, a store which is drawn upon gradually at the convenience of the persons employed in extracting the timber. Thus, a large proportion of the timber girdled during the first period of twelve years was not brought to market until many years later, and served to swell the out-turn of the second period. Again, the diminished girdlings during the second period took effect in diminishing the timber extracted during the third

period. Apart from this temporary decrease, the annual yield of the forests in timber has risen steadily, and, as already stated, the net revenue has increased largely, and this was mainly due to the increased quantity, and the improved quality of the timber brought from the forests and to the rise in the selling rates of Teak timber.

At the outset too favorable a view was taken of the rate of growth of the Teak-tree, hence the large mean annual girdlings of the first period. In 1868 we erred in the opposite direction, hence the small number girdled during the second period. The total number of trees girdled during the thirty-eight years in question was, as already stated, 660,000, or at the rate of 17,400 a year. To the present time special working plans have been prepared for eleven forest districts in the Irauddi and two in the Sitang valley, aggregating 865,260 acres. For this area (thirteen districts) the number of trees to be girdled annually has been fixed by these working plans at 13,680, or fifteen trees on 1,000 acres. The aggregate area of reserved forests in lower Burma in 1894 amounted to four million acres. A portion of this area has been reserved for the sake of other valuable trees, chiefly Acacia Catechu. The annual yield of the Teak localities, when special working plans shall have been prepared for all, may safely be estimated at 40,000 trees a year. It is most satisfactory that, although in 1856 much too rapid a rate of growth was assumed, nevertheless the girdlings during the first period were considerably below what may be regarded as the probable normal yield of these forests. It is, however, possible that the full number stated in the returns—upon which the figures here given are based—was not girdled. In those districts where the work was carried on in 1857 and 1858 no competent officers were available to superintend the work.

The aggregate net revenue which these forests have produced during the thirty-eight years in question has amounted to 27,240,000 rupees. During the first two periods, until 1879, the rupee was worth on an average two shillings, but, owing to the depreciation of silver, its value has since diminished steadily, until during the five years of the last period it averaged fourteen pence. Expressed in gold, the aggregate net revenue from these forests during this period of thirty-eight years has amounted to £2,093,000. During the five years ending with 1894 the mean annual surplus revenue has amounted to £109,080, or \$545,400. On an area of four million acres this amounts to sixpence an acre, a rent with which no forest proprietor in the United States would be satisfied. But it must be remembered that Teak and Acacia catechu, at present practically the only marketable trees, form less than one-tenth part of the whole growing stock, and, what is more important, that all the easily accessible portions of the forest had previously been cleared out, and that a large portion of the annual expenditure is devoted to the improvement of the forests by planting and otherwise.

The disastrous consequences which in 1860 the merchants of Rangoon predicted would inevitably follow if the system initiated in 1856 were persevered in, have not taken place; the use of iron has increased all over the world, and yet Teak timber is not a drug in the market; its price has risen steadily. It has chiefly been the wonderful development of the British Indian Empire since that time which has thus increased the demand for Teak timber. The millions inhabiting that empire are prosperous, teak is the best timber in a tropical climate, hence the export of this article from Burma to other parts of the Indian Empire has increased largely. A portion only, however, of this timber is the produce of the forests in lower Burma. Those of upper Burma and of that portion of Siam which is situated within the catchment area of the Salween River also yield large quantities. At the commencement of the period of thirty-eight years here adverted to, the quantity exported annually from Rangoon and Moulmein amounted to 86,000 tons. During the five years ending 1893-4 it has averaged 182,000 tons. This shows the increase in the demand for Teak timber during that period.

Bonn, Germany.

Dietrich Brandis.

Recent Publications.

Familiar Trees and their Leaves. Described and illustrated by F. Schuyler Mathews. New York: D. Appleton & Co.

This book, with its attractive cover and well-printed pages and illustrations, is another effort in a popular style to help those who have but little botanical knowledge to identify the different trees encountered by the roadside or in the forest. In a brief introduction Professor Bailey says:

"There are two ways of knowing trees: one is the way of human feeling and sympathy through which a tree becomes a part of one's self as the sunshine does and is identified with every hallowed experience. Another way is the botanical or analytical way which scrutinizes every detail, is essential to truth but not to feeling, and is so likely to restrict and dwarf the vision and the sympathies as to make the tree but a laboratory filled with curiously fashioned mechanism." All this may be true, but we never chanced to meet with a man whose appreciation of the beauty or poetic charm of a tree was dulled because he knew so much about it. We have never yet been acquainted with an astronomer whose scientific attainments prevented him from feeling the sublimity of the starry heavens, nor with a geologist to whom the landscape was less lovely because he was familiar with the history of its rocks and knew the laws of the great forces which had moulded its surfaces. It is certainly true, however, that many persons who would like to know something about trees have neither the time nor the inclination to take up the systematic study of botany; and yet a book whose direct purpose is to help beginners to distinguish one tree from another by means of their leaves will be of little use unless it describes these leaves accurately and compares them so as to bring out their resemblances and differences. If this is done correctly it is science, and true descriptive science as far as it goes. There can be no question as to the usefulness of a book which leads the beginner to examine and compare the leaves and barks and fruits of trees for the purpose of identifying them, for these features can be seen at almost any time of the year, and unless one knows them familiarly and thoroughly he never can become acquainted with the different species. If trees are taken up as part of a course of botanical study, with shrubs, herbs, grasses, etc., their flowers or reproductive organs are likely to be the leading characters investigated. These are often minute, hard to secure, and they usually remain but a few days. It is, therefore, much more natural for one who simply wishes to learn how to recognize trees to use a manual in which the leaves are the features mainly relied on for determining them. To serve this purpose Professor Apgar has already prepared an admirable little manual, entitled *The Trees of the Northern United States*, and by the help of a key and drawings of the leaves it is quite easy for any one to make sure of the name of any tree of which he has secured a specimen branch. This book of Mr. Mathews is a good one, too, because in the main the drawings are accurate and the statements are clear and true, which means that it is good botany. It would have been more helpful if it had been more systematic—that is, more scientific. In preparing a manual to enable students to distinguish the leaf of a Willow from the leaf of an Oak or any other tree, there can be no better way than to make a drawing of a leaf which is as nearly typical as may be, and then give a description in the old-fashioned way. This Mr. Mathews has done fairly well.

The drawings would have been more useful if the scale as compared with the natural size of the leaf had been given in each instance. They are usually spirited and accurate, but since Mr. Mathews tells us that he draws any leaf which he may come across, whether typical or not, he frequently draws those like the Crab-apple, on page 60, which are not of the usual form. The serrate, heart-shaped leaves of our Lindens are distinctly oblique at the base, but this last character is not shown at all, while the unlobed form of the Mulberry-leaf shows an inequality which it does not have. The strong, curved, parallel ribs are striking characteristics of all our Dogwoods, which the drawings fail to emphasize. Perhaps Butternut-leaves with nine leaflets can be found, but they almost never have so few, and the double buds of these trees are usually so conspicuous that when the twig on which the leaf appears is added this character might well have been introduced. We have also observed occasional inaccuracies in the descriptions and a few obscure and erroneous statements, but

in the main the book is a trustworthy guide. It will serve a good purpose if it encourages any reader to observe trees more closely, for, after all, books of popular science can do little more and nothing better than to stimulate habits of personal investigation.

Notes.

The great Botanic Garden at Buitenzorg, in Java, has the richest collection of Palms in the world. There are three hundred determined species and a hundred which appear distinct, although they are yet unnamed, besides varieties of known species, so that it may be said that there are at least four hundred different Palms cultivated there.

The Gardeners' Chronicle for August 22d contains the first part of a monograph by Mr. J. G. Baker on the genus *Brodiaea* and its allies. There has been so much confusion in the nomenclature of these American bulbous Liliaceæ that botanists and every one who grows these beautiful plants will feel under obligation to Mr. Baker for classifying and describing the species.

Trees of *Magnolia cordata* in this vicinity are giving a second crop of bloom this year, which, in truth, is not a very uncommon thing, but owing, perhaps, to the abundant rains and warm weather the bright canary-yellow flowers are rather more abundant than usual. This is now classed by botanists as a variety of the Cucumber-tree, *M. acuminata*, but the color of its flowers, its broader, more darkly green and more persistent leaves make it quite a distinct tree for garden purposes.

The so-called Japanese Wineberries, *Rubus phoenicolasius*, have been marketed, it seems, in limited quantities at Portland, Oregon, and in other cities on the Pacific coast during the present season. It is said that the fruit appears to be larger and better than it has been in former years, and it commands about the same price as Black Cap raspberries. We have never seen any of the fruit in this market, and should like to hear the experience of any persons who have grown this berry for sale.

Half-dead conifers by the hundred have been removed from Central Park during recent years, but too many still remain to mar the beauty of the landscape and often to impair the effect of well-grown adjacent trees or prevent younger ones from attaining symmetrical development. On the western edge of the East Drive, opposite McGown's Pass Tavern, there are a dozen decaying and unhappy-looking Spruces which could be cut out to the immediate profit of their neighbors and to the improvement of a picturesque bit of road.

At the last session of the Ohio Legislature an act was passed to prevent the spread of contagious diseases among fruit-trees, especially the yellows and the black-knot. The act provides for the destruction and burning of trees and fruits infected by the yellows, and, in accordance with its provisions, the experiment station has just issued a bulletin giving full information relative to the different diseases, with illustrations and with regulations and directions for marking and destroying the trees by the fruit commissioners of the various townships.

All kinds of fruit are now so abundant in this city that only the very best qualities are salable at remunerative prices. The best Bartlett pears in large barrels have brought \$4.25 at wholesale; the few Seckels which have come to market have sold for as much as \$5.00 a barrel. Plums are coming generally now from western New York, and good Green Gages bring only twenty-five cents a basket, and the best Lombards and Egg plums no more than forty cents. Grapes are abundant and cheap. A few Tokays, from California, brought \$2.00 a box, but, of course, they have not as yet much color.

The city of Leipsic is encircled as far as the eye can reach by a monotonous plain. Many years ago the City Council ordered that all the refuse and ashes of the town should be deposited at a certain point in a suburb which is imaginatively called the Valley of Roses, a suburb which in reality shows no valley and is chiefly devoted to the cultivation of prosaic edible vegetables. Gradually this ash-mound, which has been named Mount Georgi, in honor of the burgomaster who decreed it, has risen to the imposing height of some 120 feet, and the Council recently appropriated the sum of ten thousand marks for the purpose of covering it with vegetation and erecting upon its summit an outlook tower which they assure the world will be a most attractive point of pilgrimage. Ameri-

cans who read of the long effort which the citizens of Leipsic have been making to enliven the landscape ought to feel some compunctions of conscience at their neglect of the original and striking natural beauties of their own cities which are so often despised and destroyed.

The last number of *The Garden* contains a beautifully colored plate showing various hybrids of the Pheasant's-eye Narcissus, and in a brief, but instructive, article the Rev. G. H. Englehart calls attention to the wide range over which hybrid Narcissi have expanded, so as to embrace greater variety of form and color, since the blood of *Narcissus poeticus* has been introduced. Stately and beautiful as the Trumpet Daffodils are, there would be a considerable sameness among them without the *Poeticus* blood. Secondary crosses between *N. incomparabilis* and *N. poeticus* give the most brilliant scarlets and oranges by infusing the red in the eye of the latter into the highly colored hybrids which have already derived their color from the first cross. One of these figured hybrids has a cup of apricot-scarlet, another of clear yellow, with a perianth as purely white as that of *N. poeticus* itself. Mr. Englehart also notes that by intercrossing good forms of the Pheasant's-eye Narcissus and by seed selection this species is capable of great increase in size and enrichment of color, showing solid, bold, well-formed flowers almost twice the size of those of *Poeticus ornatus* and with large eyes deeply suffused or margined with fiery red.

Mr. George A. Cochrane, in writing to the *Country Gentleman* about foreign markets for our fall apples, says that the fruit crop in Europe for this year is likely to be no more than fair, but that there will still be an active demand for American apples if carefully selected and well packed. There are many varieties of fall apples growing in New England and New York which have been thought too tender for the long voyage across the sea, but since the introduction of fast steamers they could be exported with profit if packed in boxes holding half a barrel, with each piece of fruit wrapped in paper, as oranges and lemons are transported. The boxes recommended are similar in style to ordinary orange boxes with a middle piece, making two apartments, and nailed so as to leave a space of at least a quarter of an inch between the strips. Duchess, St. Lawrence, Alexander, Gravenstein, Snow and Wealthy, which will not carry safely in barrels, will carry perfectly well in these boxes, and in some instances a case of well-packed and well-selected fruit will bring as much as a barrel. It should be borne in mind that in England crisp apples with a hard meat are preferred. Soft-meated or mealy fruits, such as Porter, Williams and Astrachan, are not favorites.

Bulletin No. 45 of the Illinois Experiment Station is taken up with a record of the different kinds of Apple-trees which have been planted on the experimental farm of the University of Illinois, during the past twenty-seven years, and the following are the varieties which have given promise of the highest and most continuous value, taken in the order of their season of ripening: William Prince, Red Stripe, Hicks, Cole's Quince, Large Yellow Siberian Crab, Jefferies, Sharp's, Utter, Jonathan of Buler, Sweet Bellflower of Wyandotte County, McLellan, Higby Sweet, Mansfield Russet, Westfield Seek-no-further, Coon's Red, Ned, Indiana Favorite and Royal Limbertwig. The descriptions of all these apples and many more are given with great care and will be found a valuable supplement to the fruit lists of the Pomological Society or of local state societies. It is rather a singular fact that good authorities like Downing, Warder and Thomas differ so widely in their descriptions of the various characters of apples. One, for example, will describe the flesh of a certain apple as white, while another will call it yellowish. The truth is, as stated in this bulletin, that there are individual characters which it is impossible to describe accurately or minutely, but which, nevertheless, distinguish the variety. These are rarely all present in any one specimen, and it is not uncommon to find a number of specimens together, each of which or all of which lack some one very characteristic mark. As a rule, the more minute the description the more likely it is to fall into error. This comes (1) from individual variation, (2) from variation with the season, (3) from slight peculiarities, climatic differences, etc., because apples grown in one locality differ in form, quality and other characters from those grown in another. Descriptions which have been made of the same variety in different seasons often vary more or less, and sometimes vary so widely as to justify the supposition that they were made for different varieties. Fruit which is undoubtedly of the same variety is not always the same on different trees, and summer pruning and other cultural conditions are often potent in causing variation.

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Fertilizers and Flowers.

DURING recent years there has been an immense increase of popular knowledge relating to the use and action of fertilizers upon the growth of crops. So much instructive literature on this subject has been disseminated by our agricultural experiment stations, by the addresses at farmers' institutes and societies and in the agricultural and horticultural newspapers, that farmers and truck-growers use manures much more intelligently and effectively than they did a few years ago. In many cases they buy different chemicals and mix them so as to form a fertilizer which combines nitrogen, phosphoric acid and potash in different proportions, and they are careful to apply it to different soils and upon different crops, so that a certain amount of each of these nutriment in an available form is supplied for their roots.

Now, it is understood that the soil is something more than a storehouse for plant-food. Aside from its chemical contents, its structure and texture are of great importance, since it must be so formed mechanically that it will retain the plant-food in a watery solution so that the roots can take it up and yet be sufficiently open to allow the admission of a proper amount of air, which is just as necessary to the parts of the plant below the surface of the ground as to the parts above it. No cultivators take greater pains and show greater skill in securing soil that is just in the proper mechanical condition than florists do, and a large amount of the success in floriculture depends on the skill with which the soil is prepared so that its particles will be neither too small nor too large—neither too loose nor too binding. But, somehow, the question of scientific fertilizing has not yet received as much study by florists as by truck-growers and farmers. Owing to the small amount of soil to be enriched, it costs but little to use an abundance of whatever fertilizer may be at hand, and long practice has given flower-growers skill to note whether a plant seems overfed or starved, and they give or withhold as the case may be. Nevertheless, it is quite possible that sometimes a plant which seems starved is abundantly provided with all sorts of nutriment except a single one, while another plant which is overfed may only have a surplus of one ingredient.

Professor R. C. Kedzie therefore did a wise thing when he read an address, at the late convention of the Society of American Florists, devoted to the application of fertilizers to plants for flower-growth. In a familiar way he told how nine-tenths of the substance of cultivated plants—carbon, etc.—comes from the air, and that of the remaining elements almost all of them are found in abundance in ordinary garden soil, and explained that the florist needed phosphorus, nitrogen and potash for his plants, just as the farmer needs them for his crops. He showed them how potash stood at the very portals of vegetable life to help the chlorophyll cells in their work of active assimilation; he showed how phosphorus is closely in touch with the principle of life from the very beginning, and is needed especially in the development of the root and leaf of all young plants; he showed, too, how the highest products of plant life are all rich in nitrogen, and that when this element is supplied in abundance there is a luxuriant growth and the leaves acquire a particularly dark green color; and just here he made a practical suggestion. A riotous leaf-growth is increased by the application of nitrates, but it is sometimes accompanied by the arrest of fruit formation, and the flowers become sterile and fall off and few flower-buds are formed. Now, the superphosphates have a direct tendency to the formation of flowers and fruits, and in this fact may be found a corrective for the tendency of nitrogenous manures to excessive leafage just as the farmer uses the soluble phosphates to hasten the setting and ripening of his crops. An instance in orchard practice was cited which illustrated this point. A large collection of Pear-trees had been set out on rich ground, and they grew vigorously until the trees were of large size, but they bore no fruit. The farmer was advised to give the orchard a liberal dressing of plain superphosphate, which he did, with the result that the orchard produced a crop of pears in one year that sold for enough money to pay for the whole farm. Now, since the woody growth of a Pear orchard can thus be turned to fruitfulness, it might seem that the plants which have been forced into making a great leaf-growth by nitrate of soda might be induced to energetic flowering with a superphosphate, and in this way the alternate use of the two kinds of manure could be turned to practical advantage.

But this is only a single example of what might be done by the use of different nutrients. Well-rotted stable manure contains all the elements of plant-food, and it has a beneficial effect on the mechanical condition of many kinds of soil. It probably helps, too, in another way by furnishing a congenial home for the various bacteria and other organisms which are necessary to prepare the mineral ingredients of plants for absorption. The use of abundant stable manure in many of the market-gardens of Long Island has filled the soil with humus to such a degree that no more is needed, and, therefore, in many instances commercial fertilizers are used entirely. No doubt, soil of such richness and texture can be prepared by florists that no plant-food need be used except the three elements which are found in the so-called "perfect" fertilizers of commerce. And just here is the opportunity for many experiments which may bring results of genuine practical value. It might be shown what proportion of each was best adapted to given soils or particular plants, or for special purposes. It would be interesting to know whether an excess of either nutrient would be useful in prolonging the flower season, in making flowers more lasting, in the particular development of leaves in foliage plants and in numerous other directions.

Professor Kedzie advises as a practical matter that the best way to furnish potash for general use is to give it in the form of ashes. Indeed, he names wood ashes as a fertilizer of the first importance. These ashes contain all the mineral matter of plant-growth, and without this matter in some form no plant can grow. The potash, too, is more active than it is in some chemical conditions, because it is alkaline and the ash contains in a very finely developed condition all the remaining minerals that are taken up by plants. The

Stassfurt salts in some form, whether sulphate or muriate, is the next best way of applying potash. Chili saltpetre will be the main reliance for nitrogen since it contains sixteen per cent. of that substance and is better suited to most soils and plants than the salts of ammonia. Desiccated blood is also rich in nitrogen and gives out its supplies more uniformly, and is not washed out by sudden rain or a profuse watering, and it does not "burn" the plants in a dry time. It also contains some potash and phosphates and a good deal of valuable organic matter. Bones in some shape remain the favorite form of phosphoric acid, and they have an additional value because they contain animal matter which is rich in nitrogen, and because they are more easily dissolved than the mineral phosphates, like the South Carolina and Florida rock. The more finely divided the bone is, of course the more active and valuable it is. All the commercial fertilizers on sale contain these elements in various proportions, and in states where some legal control is exercised over this trade the stations will furnish on application the percentage of each ingredient, with its condition as to solubility, etc., in any given brand of which a sample is sent.

An English visitor at Newport, writing to the *Liverpool Evening Mercury* about the palatial residences of that city, is impressed by their size and splendor, and has this to say :

The situation of these houses, the distribution, the separation without fencing or walling, give to the whole scene an unimaginable stateliness, with the bay as a glorious outlook. No words can convey an idea of the marvelous spectacle of well and graciously and artistically applied wealth which has harnessed to its aspirations the greatest architectural art of the country. The best part of the whole story is that all around the edge of the great cliff there is a beautiful well-kept path. A lovely sward comes down to it and the palaces all stand well back, two hundred yards, perhaps, from the cliff. Observe, there are no fences, nothing to prevent you, if you are rude enough, from walking up the lawn and staring into the cottagers' lordly windows. No one does, but anybody might. How is it that these palace mansions are built in this open, unprotected way? Well, there was a right of way around the cliff, which had to be respected, and so the cottagers agreed upon the present policy. We know what would have happened in England. The path would have had a grim wall built just inside of it, and the dukes and gentlemen who were going to build the mansions would have instructed their architects to secure for them a maximum of sea view, while taking care that the passing pedestrian public got a minimum of opportunity to see their houses and grounds. Instead of that these much-abused American millionaires hit on the bold and beautiful idea of building two hundred yards in and leaving their grounds and lawns absolutely open right down to the public path. The result is such a combination of natural and contrived beauty, open for the enjoyment of all, as cannot be seen on such terms anywhere else in the world.

We have had occasion to criticise what seemed to be the ostentatiousness or excessive showiness of many of the houses at Newport, and the lack of good taste shown in the over-elaborate and gaudy treatment of many of their grounds. At the same time we have praised the neatness with which these grounds are kept, and the advantages to the public of the open promenade upon the brow of the cliff, with its wonderful beauty and magnificent outlook. This English visitor does not seem to have received the impression of vulgarity which these palatial houses, calling themselves cottages, have made upon some American eyes. But what is rather more astonishing, the traditional English love of privacy does not seem to have been offended by the omission of tall boundary walls and screening plantations.

The vegetable life does not content itself with casting forth from the flower or the tree a single seed, but it fills the air and the earth with a prodigality of seeds so that if thousands perish thousands may plant themselves, that hundreds may come up, that tens may live to maturity, that, at least, one may replace the parent.—*Ralph Waldo Emerson.*

Botanical Gardens.—II.

PROFESSOR BRITTON continued his address by giving some brief descriptive notes of some of the foreign gardens. These include the great garden of Buitenzorg, of Java, which contains eleven hundred acres, and has been in operation for eighty years; the Royal Gardens at Kew, of which at different times we have given somewhat full descriptions; the Royal Gardens just outside the city of Berlin, with their great herbarium and a museum of economic, systematic and archæological collections; the long-established Jardin des Plantes of Paris, with its enormous herbarium, library and laboratories, a grand institution which for more than a hundred years has been making contributions to the literature of botany; the Garden of the University of Vienna, established in the middle of the last century; the Botanical Garden of Geneva, with the herbariums and libraries gathered by De Candolle and Boissier; the gardens at Edinburgh, at Dublin, at Brussels, St. Petersburg, Trinidad and others. The conclusion of the address is as follows :

BOTANICAL GARDENS IN THE UNITED STATES.—The first botanical garden established in America was begun by John Bartram in Philadelphia in 1728. In it he placed a considerable number of plants obtained in the course of his extensive travels. The plot still remains, including the family homestead, somewhat modified, and it is a pleasure to know that it will be preserved as public ground by the city.

André Michaux in the latter part of the last century planted gardens at Charleston, South Carolina, and New Durham, New Jersey, but they were essentially nurseries, from which he sent seeds and plants to Europe.

In the year 1801 Dr. David Hosack, then professor of botany and materia medica in Columbia College, purchased twenty acres of ground in New York City, and called it the Elgin Botanical Garden; in this tract he accumulated with great labor during the next ten years a very large and valuable collection of plants. The institution was transferred to the state of New York through an act of the legislature in 1810, and was then known as the Botanical Garden of the State of New York. It was subsequently granted to Columbia College. Funds for its maintenance were not provided, however, and it was ultimately abandoned. Two catalogues of its plants were issued by Dr. Hosack, one in 1806 and another in 1811. The condition of botanical gardens in America at that time is indicated by the following note in Dr. Hosack's catalogue of 1806 :

"I learn, with pleasure, that a botanic garden is proposed to be established near Boston and connected with the University of Cambridge. The Legislature of Massachusetts, with a munificence which does them honour, have granted for this purpose a tract of land, the value of which is estimated at thirty thousand dollars, and several individuals have evinced their liberality and love of science by voluntary subscriptions to the amount of fifteen thousand dollars towards the establishment and support of that institution. Another is also begun at Charleston (South Carolina), and a third is contemplated in New-Jersey in connection with the College of Princeton."

In the year 1824 there was published at Lexington, Kentucky, the *First Catalogues and Circulars of the Botanical Garden of Transylvania University at Lexington, Kentucky, for the year 1824*, by W. H. Richardson, M.D., President of the Board of Managers, and C. S. Rafinesque, Ph.D., Secretary. This rare pamphlet, which is not recorded in Dr. Call's very complete life and writings of Rafinesque, is of twenty-four pages, and is printed alternately in English and French. It is essentially an appeal for plants and material for the garden and a list of plants that it could furnish to kindred institutions. This garden was evidently short-lived, inasmuch as in Rafinesque's *Neogenyton* of the following year, 1825, he remarks, "I mean, therefore, to indicate and propose in this small essay many of the numerous new genera of plants detected or ascertained, some of which were indicated last year, 1824, in the Catalogue of the Botanical Garden which I have tried in vain to establish in Lexington."

The principal gardens at present operated and in course of development in the United States are as follows :

1. The Botanic Garden of Harvard University, at Cambridge, Massachusetts, founded in 1805. There are here about seven acres of land under cultivation, a small greenhouse and a famous herbarium and library from which have flowed during the past forty years voluminous and invaluable contributions to taxonomy and morphology, especially of North American

plants. There is also a small morphologic laboratory. The main laboratories and museums connected with the institution are situated in other of the Harvard buildings, a short distance away. The system of garden libraries, museums, laboratories and herbaria operated by Harvard College is one of the most complete in existence. It is hard to say, indeed, in what respect it is not ideal, except in the rather wide distance separating the several elements and the small amount of land available for planting.

2. The Arnold Arboretum of Harvard College, at Jamaica Plain, Massachusetts, founded through a bequest of \$100,000, made about 1870, by Mr. James Arnold, of Providence, Rhode Island, to three trustees, to be used for the improvement of agriculture or horticulture. The trustees wisely determined to devote it to forestry and dendrology, and effected coöperative agreements with Harvard College and the city of Boston, which have now given us the greatest tree museum in existence, freely open to the visiting public. The planted area is about 160 acres, and will be materially increased in size. A good museum, library and herbarium building has been erected near the main entrance. The great *Silva of North America* and the journal *GARDEN AND FOREST* are noteworthy publications from this noble institution.

3. The Botanical Gardens of the United States Department of Agriculture, at Washington, with an extensive range of greenhouses and a large tract of land under cultivation. The herbarium of the department, now deposited with the United States National Museum, is very large, and is at present increasing more rapidly than any other in America. There is a somewhat effective working library which greatly needs material enlargement, and several poorly located and equipped laboratories in which a vast amount of important investigation is being accomplished, under very unfavorable conditions, which urgently demand improvement. Publications include *Bulletin of the Botanical Division*, *Bulletin of the Division of Forestry*, *Bulletin of the Division of Plant Pathology and Physiology*, *Contributions from the United States National Herbarium*, *Year-book of the United States Department of Agriculture*, and circulars of the several divisions.

4. The Missouri Botanical Garden, at St. Louis, Missouri. This was established in 1889, through the provisions of the will of Mr. Henry Shaw, who for over thirty years previously had been bringing together material for it on the land about his residence, which was known as Shaw's Garden. There were in all some 670 acres devised to the institution under the will of the generous and philanthropic founder, and from the income yielded by much of this land, not nearly all the area being required for garden purposes, the institution derives its large maintenance fund, which will certainly be greatly increased as the land becomes more valuable, and will supply an income sufficient to operate the institution in the most effective manner. There are several greenhouses, a very large and valuable herbarium and library, while the laboratories of the Shaw School of Botany, at Washington University, are in close relationship to the garden. Much important research, principally taxonomic, has been prosecuted. Publications consist of seven volumes of annual reports, and nine *Contributions from the Shaw School of Botany*.

5. The Botanical Garden of the Michigan Agricultural College. This was begun in 1877, and there are now about three acres under high cultivation, exclusive of the arboretum and decorative grounds, which together cover several acres. There are several small greenhouses, an herbarium of about 60,000 specimens, a good botanical library and extensive well-equipped laboratories.

6. The Botanical Garden of the University of California, at Berkeley. This was established some years ago and comprises several acres in which a large number of plants are grown. It furnishes a valuable adjunct to the work of the botanical department, which has well-equipped laboratories, a working library and a large herbarium.

7. The Garden of the University of Pennsylvania, recently established. It comprises about three acres in the immediate vicinity of its building, in Philadelphia, and has many species under cultivation. The extensive and well-appointed laboratories of its School of Biology, good library facilities and a small herbarium afford capital opportunity for research, especially in physiology and morphology.

8. Smith College, at Northampton, Massachusetts, has also recently established a botanical garden on the campus.

9. The Buffalo Botanical Garden, in South Park, Buffalo, New York. This was commenced in 1893, and has since made rapid and encouraging progress. A small range of greenhouses has been built and others are planned. A beginning has been made in accumulating a library and

herbarium, and much permanent planting has been accomplished.

10. The New York Botanical Garden. The establishment of the New York Botanical Garden was authorized by the Legislature in 1891, and the enabling act amended in 1894. The enterprise was inaugurated and the legislation procured by a committee of the Torrey Botanical Club, appointed in 1889. The act of incorporation provided that when the corporation created should have raised or secured by subscription a sum not less than \$250,000, that the Commissioners of Public Parks were authorized to set apart and appropriate a portion of one of the public parks, not exceeding 250 acres, and the Board of Estimate and Apportionment was authorized to issue bonds aggregating the sum of \$500,000, for the construction and equipment, within the grounds, of the necessary buildings. The subscription of \$250,000 required by the act of incorporation was completed in June, 1895, and the Commissioners of Public Parks, in the following month, formally appropriated 250 acres of the northern part of Bronx Park for the purposes of the Garden. Since that time the preparation of plans for the development of the tract has been steadily progressed, including designs for the Museum Building and large Horticultural House. This planning is still in progress in charge of a commission of architects, engineers, gardeners and botanists, who will complete their work within a short time and be ready to submit a complete scheme to the Board of Managers during the coming autumn. Meanwhile, much preliminary work has been accomplished in clearing the ground, in grading, in the planting of borders, in the establishment of an extensive nursery, and in the accumulation of herbarium, museum and library material. Through a coöperative agreement entered into with Columbia College, the herbarium and botanical library of the college will be deposited with the Garden, and most of the research and graduate work of the college in botany will be carried on in the new Museum Building.

The endowment fund has been materially increased, and about 430 persons have become annual members of the Garden, contributing ten dollars a year each to its support. The publication of a Bulletin has been commenced by the issue, in April, of the first number of Volume I.

The Wood Pulp Supply and Our Spruce Forests.

THE increased demand for white paper for newspapers and other uses has emphasized greatly the value of our Spruce forests, but, unfortunately, the pulp mills have had less regard for the future of their supplies than for the immediate profits in the business. There are upward of two thousand pulp and paper mills in the United States, and they are all busily engaged in denuding the Spruce forests for the purpose of supplying a cheap material for printers and publishers. A cord of Spruce wood makes about 2,000 pounds of wood pulp, and as the average cost of this wood in New England and New York is \$7 to \$8, no cheaper material for making paper can be found. In parts of New England an acre of Spruce land, carrying about fifteen cords, can be purchased for from \$12 to \$20, or in many places the wood can be had at \$1 per cord on the stump.

The cost of cutting and transporting the wood to its destination represents a heavier item than the mere purchase of the trees, especially if the forest is situated at a distance from a river or transportation line. In 1893 the demands for wood pulp exhausted the entire growth of Spruce on at least 100,000 acres, and since then the demand has increased annually at the rate of fifteen per cent. The outlook for the coming year is that nearly 200,000 acres of Spruce trees will be needed to supply the demands of the paper makers and wood pulp manufacturers, for in recent years many articles other than paper are made out of Spruce wood pulp.

The question of the exhaustion of the Spruce lands is of paramount importance just now, for Spruce lumber has an intrinsic value aside from its importance in the paper industry. No wood can, in fact, take its place in the light construction of house frames. The only woods that can approach it in this respect are white wood and the Southern pine, but pine lumber is selling for about \$5 per 1,000 feet

more than Spruce to-day. Of the two for ordinary building purposes the Spruce lumber is far more valuable.

Under this increasing demand the value of Spruce timber land is steadily advancing, and the owner of a good forest of these trees near a river or railroad could not find a better investment where his money would surely pay a high rate of interest. Within a few years Spruce lumber has advanced from ten and twelve dollars per thousand feet to fifteen and eighteen dollars. But even at this latter price, the highest yet reached, it is only on a par with White Pine and lower than the Southern Pine. If the mills continue to denude the Spruce forests at the present rate the value of good timber will nearly double itself in the next twenty years.

It is a matter of considerable concern to small owners of Spruce lands to know that the manufacturers of wood pulp and the owners of large mills are making provisions for the future by thinning out the forests instead of cutting them clean. The young saplings are allowed to remain, and in twenty years they will be mature trees, ready to yield another crop. On the other hand, there is a noticeable lack of intelligent cutting among many of the small New England owners, who either sell all of the Spruce trees on their land, or cut down, indiscriminately, the small and large trees. If only the large, mature trees, measuring twelve inches in diameter at the base, are cut down, the young trees grow rapidly and quickly make up the loss.

In Germany Spruce forests are cultivated so that the supply of wood pulp is even greater than in this country. No trees under one foot in diameter at the base are cut down for the mills, and the forests, although yielding an enormous supply, are only thinned out each year. It has been the cheapness and comparative abundance of Spruce trees in this country that has caused the willful waste, and there is danger that another area of neglect will follow the opening up of the Spruce regions in the Dominion of Canada. The Spruce forests in the Province of Quebec are said to be more extensive than all those combined in the United States, and the cost to lumbermen is about one-half what they have to pay for it in this country. Many of the mills, therefore, have been moved into Canada, and the lumbermen are denuding the primitive forests as fast as steam will permit.

The Canadian Government has been making efforts to protect the forests under its jurisdiction, and if something could be done to stop the greed of the paper mills it would redound to the benefit of both countries. Our pulp mills have been rushing into Canada so rapidly that a good part of our supply of wood pulp in the next year or two will come from that country. This temporarily relieves the strain upon our own forests, but as the supply in Canada cannot continue forever the subject of restricting the destruction of the Spruce trees in this country might meet with less opposition from lumbermen than formerly. Canada realizes but little from the exports of its forest products, for the raw material is sold at very low prices, and the country suffers more than she receives as a result.

Some of the largest capitalists have been greatly disappointed in the supply of Spruce trees in New England in the last year or two. The railroads that have been pushed into the heart of the woods have failed to tap forests as rich in lumber as was generally expected. The supplies along the Androscoggin, Penobscot and Kennebec have also materially diminished, and the floods and freshets have helped to make the supply for the mills uncertain. The safest way of getting the raw material is by the aid of railroads, and these are now being constructed in endless numbers all through the woods. Where such expensive methods of transportation are constructed the forests are likely to be better protected than on the lines of the rivers. Some of the large wood pulp mills and railroads represent a capital invested of over half a million dollars, and it is only reasonable to suppose that they are intended to be permanent. They can be made permanent, however, only by having the forests properly handled.

A trip through the Spruce forests will readily convince one that forest management is being practiced to a certain extent along the railroad lines connecting with expensive mills, but that it is entirely neglected along the rivers where smaller mills have been built merely to rob the woods of lumber they can find growing. In this respect the large capitalist is a better protector of the forests than the small lumbermen; not because he loves the forests, but because they bring larger returns and make his property more valuable for the future.

New York.

G. E. W.

Foreign Correspondence.

London Letter.

EUCALYPTUS CALOPHYLLA.—Among the many representatives of this genus grown in the conservatories of this country *Eucalyptus calophylla* is one of the most ornamental. It forms a sturdy, leafy, pyramidal tree, and flowers when from twelve to twenty feet high, the flowers being borne in crowded clusters on the young branches, and each flower a green cup-like calyx bearing a brush-like head of white stamens two inches across. The leaves are ovate-lanceolate, about five inches long, bright green, with a whitish margin, the midrib, petiole and bark of the young branches being bright red. There is a healthy example of it now flowering freely in the temperate-house at Kew, where it is planted in a peat-bed in the sunny end of the house along with Grevilleas, Acacias and other Australian plants. An excellent figure of this species was published under the name of *E. splachnicarpon* in *The Botanical Magazine* in 1843, prepared from a plant flowered at Kew in that year. It had been introduced by Allan Cunningham, who discovered it in King George's Sound, where it forms an immense tree. It is one of the most beautiful of the trees grown in the streets and gardens in South Africa. The flowers are among the largest of the genus, and it equals any of the species in rapidity of growth.

TRIAS DISCIFLORA.—The genus *Trias* is closely allied to *Bulbophyllum*, which it resembles in habit and foliage. Only some half a dozen species are known, and they are all Indian. *T. disciflora* was introduced about two years ago from Siam, and flowered in the nursery of L'Horticulture Internationale, Brussels. It was at first thought to be a *Bulbophyllum*. A plant of it is now in flower at Kew. It is by far the largest-flowered and most striking of the species. The pseudo-bulbs are clustered, each nearly an inch long, broadly ovoid, one-leaved, the leaf four inches long, thick, fleshy and lanceolate. The scapes spring from the base of the matured pseudo-bulbs, and are about an inch long, one-flowered, the flower being nearly two inches across. The sepals are triangular, an inch long, half an inch wide at the base, colored yellowish green, with numerous spots of dark red; petals small and ear-like; lip nearly as long as the sepals, tongue-shaped, fleshy, with a central groove and a pair of auricles at the base; the surface is covered with minute, dull red, wart-like dots. Column green, with a pointed, beak-like anther. The plant deserves a place in large collections of tropical Orchids.

TEA ROSES.—We are only now learning how to appreciate and make the most of these plants in summer gardening. Twenty years ago many cultivators looked upon the Tea Rose as a delicate plant that required pot culture and the protection of a frame or house in winter. We now know that they are not only perfectly safe in the open bed, but that they make a far more beautiful display from June till September than any other section of the great Rose family. I lately saw in the garden of Mr. W. Robinson, at Gravetye Manor, Sussex, a flower garden formed entirely of Tea Roses, and a more beautiful picture it is impossible to imagine. Mr. Robinson has long been an admirer and collector of Tea Roses, and he now possesses a large collection of all the best that are known. They are, he says, mostly grafted on the Brier, but at Kew we find it an

advantage to have them on their own roots. Severe frosts kill the shoots down to the ground, but this does not much matter as the plants push into vigorous growth from below as soon as warm weather returns. At Kew the shoots are protected from frost by sticking a few Yew branches about them. Mr. Robinson does not mulch his Roses with manure, the only mulch they get being a sort of carpet of bedding Violas (Tufted Pansies), Saxifragas, etc. Where the soil is poor or the subsoil gravelly, I should, however, recommend a good annual mulch with manure. In Mr. Robinson's garden the Roses are grouped in beds upon a smooth lawn, some of the varieties being represented by groups of a dozen plants or more. The effect of the whole, when the flowers are at their best, is superb, while monotony is impossible, owing to the ever-changing character of the display, to-day's best rose being second or third to-morrow, and so on. Mr. Robinson gives the palm to Marie Van

stone. It will be perceived from the names that most of these are of French origin. I do not pretend to have included here all that are first-rate, but any one who secures these and cultivates them properly will have a good representative collection of Tea Roses. [We are glad to have this report as to the condition of the Tea Roses at Gravetye Manor in late August. In mid-June they made a picture which no one who saw them can forget, and doubtless their beauty and fragrance will be a continual delight until late in autumn. They certainly make one of the most interesting features of Mr. Robinson's charming place. If any other shrub displayed its flowers all summer long we would weary of its constant presence, but who was ever tired of seeing roses? No other plant can fill the place of Tea Roses used in this way, and yet they are so rarely seen planted as they are at Gravetye that Mr. Robinson may be said to have discovered or created a new kind of garden.—Ed.]

ALTHEA FICIFOLIA.—This is the stateliest and certainly one of the most beautiful of the numerous tall herbaceous plants, Malvaceous and other, now flowering in the borders at Kew. It is, in a broad sense, a single Hollyhock, but it differs from all the forms of Hollyhock known to me in its slender stems, its deeply lobed Fig-like leaves and the development of the flowers in tufts here and there over the stems. The plants are large spreading masses, seven feet high, and the flowers are of a soft sulphur-yellow color. It reproduces itself freely from seeds and is a biennial. Although really an old garden plant, *Althæa ficifolia* was unknown in English gardens until reintroduced to Kew two years ago. It is a native of the Levant, and was cultivated in England nearly three hundred years ago.

London.

W. Watson.

Plant Notes.

Aquilegia Jonesii.

THE alpine slopes of the high mountains of northern Wyoming and Montana are enlivened in summer with this dwarf Columbine, which grows in great profusion at elevations of about 8,000 feet just west of the continental divide, where, mingled with *Fritillaria pudica*, it is conspicuous in the charming carpet of dwarf plants which covers the slopes above the springs which feed the Flat-head River. It is a densely caespitose, soft-pubescent plant with much-thickened branched, ascending root-stalks covered with the closely imbricated persistent bases of the petioles above which rise the crowded leaves of the year; these are biternately divided with minute-clustered ovate divisions. The flower-stalk, which is from one to three inches in height, bears a single bright blue flower which appears disproportionately large for the plant.

Aquilegia Jonesii, which is one of the most distinct and beautiful of the American Columbines, is, we believe, still untried in gardens, to which, however, our illustration on this page will, it is hoped, serve to introduce it. It was discovered by Dr. C. C. Parry on the Phlox Mountain, in north-western Wyoming, in 1873, and ten years later it was found by Canby and Sargent on the old Marias Pass, in northern Montana.*

Cultural Department.

Dodder on Garden Vegetables.

TWICE during this season samples of truck crops have been sent to this station with complaints of injury being done by what proved, upon inspection, to be Dodder. The first lot of attacked plants was seedling Egg-plants from a hot-bed, and the second was a score of onion tops, upon which the parasite had made itself thoroughly at home.

It is not unusual to find various species of *Cuscuta* growing upon the wild plants of the lowlands, and in some

* Parry, *Am. Nat.*, viii., 221 (1874).—Robinson, *Syn. Fl. N. Am.*, i., pt. 1, 43.



Fig. 48.—*Aquilegia Jonesii*.

Houtte, which is also the most beautiful of the varieties grown at Kew, the second best being Comtesse Riza du Parc. I made a list of three dozen of those which I thought best of those in flower at Gravetye, which I give here in the hope that it will assist those who desire to have a garden of Tea Roses of great variety in habit of growth, form, size and color of flowers, and all of first-rate quality: Anna Olivier, Augustine Guinoisseau, Bouquet d'Or, Christine de Noué, Clement Nabonnand, Doctor Grill, Duchesse d'Auerstadt, Duchesse Marie Immaculata, Edith Gifford, Eliza Fagier, George Nabonnand, Gloire Lyonnaise, Jean Gravier, Jean Pernet, Jeanne Guillaumez, Maman Cochet, Madame Hoste, Madame Lambard, Madame Joseph Schwartz, Madame Charles, Madame Welsh, Marie Van Houtte, Marquise de Vivens, Narcisse, Nardy, Pauline Labonte, Princess Marie d'Orleans, Princess de Sagan, Rubens, Souvenir de Madame Sableyrolles, Souvenir de Madame Levet, Souvenir de S. A. Prince, Viscountess Folke-

places it grows so rampant upon their various hosts as to almost give the prevailing orange color of their wire-like leafless stems to the verdure of the attacked area. Some species are fond of certain cultivated crops, the Flax and the Clovers being the most frequently found with Dodders, and sometimes to the partial destruction of the crop. Rarely do we hear of the pest making any headway in the market garden. Along with the Dodder-infested onions comes the statement that "it (the Dodder) is increasing every year," showing that the enemy has been observed before the present season.

A sun-print has been made of some of the onion-leaves, and the engraving (page 367) therefrom, half the natural size, illustrates how the Dodder fastens itself upon the host and causes the collapse of the upper portions of the leaves.

From these samples it would seem that in a trucking region the growers should be watchful for these intruders, and, realizing that they are flower and seed bearing plants, should destroy all the Dodder, if possible, before it goes to seed. Unlike a blight, smut or other fungous enemy, spraying would not avail. The true remedy is to prevent the pest from perfecting a crop of seed.

New Jersey Experiment Station.

Byron D. Halsted.

Carnation Notes.

THE season is once more at hand for housing the stock for next winter's supply of bloom. Some growers take their plants in at the end of August, while others prefer to wait until the middle or end of September, and we have seen houses filled as late as October in this state, and give excellent results. The proper time to lift depends on locality and the nature of the season. As a rule, we house our plants about September 10th. By waiting until this date we are running no risk of having any injury done by frost, and there is less likelihood of a succession of intensely hot days, which are very trying to newly lifted Carnations. We have never shaded the glass to prevent plants from wilting. If they have been taken up with good balls, carefully planted, so as to preserve the balls intact, and the beds or benches well soaked with the hose, there ought to be no signs of wilting. A syringing morning and evening on all clear, bright days, and an abundance of ventilation at all times, will insure the plants making sturdy growth.

The past summer has been specially favorable for a strong growth of the plants, and we never remember having seen them larger at lifting-time. Personally we like large plants; some growers prefer medium-sized ones. We have found from experience, however, that the larger and stronger plants start away to bloom quicker and yield a much greater profusion of bloom than a similar space occupied by smaller ones. It has been urged against the larger plants that they are more difficult to tie and clean. We have not found them so, but, even were such the case, surely the greater returns they give ought to more than counterbalance any trifling addition of labor. The new varieties sent out last spring have all made strong growth, with the exception of Jubilee, which is not one-third the size of any other novelty. Abundance, Amazinda, Triumph and Della Fox have all grown finely; the last named, however, seems to be somewhat affected with leaf disease. So far we have not noticed any signs of rust, except on Jubilee, which appears to be particularly susceptible to its attacks. There are generally a few dozen plants left over after the benches are filled. If these are potted up into from five to seven inch pots and held over in a frame until the Chrysanthemum season is over they will be found very useful for dotting about in the conservatory and to fill up any banks in the benches. There is always a likelihood of a few plants going off, and it is well to have a small reserve stock to draw upon to fill their places.

Plants grown specially for summer flowering outdoors are now very full of bloom, and under favorable conditions will continue to give a supply of flowers for six weeks yet. To keep the flowers clear the plants need to be tied up securely; the removal of fading flowers improves their appearance, and a dusting of some chemical fertilizer and loosening of the surface soil will promote floriferousness. We have tried several new kinds as outdoor bloomers, but none can be counted successes. Alaska does fairly well for a while, but cannot at all compare with the older Mrs. Fisher for quantity and quality of blooms. Rose Queen, Bridesmaid and Meteor are all worth-

less as summer bloomers outside, and are but little better inside. When we pulled our old stock out of the benches at the end of August, Lizzie McGowan, William Scott, Alaska and Tidal Wave were almost as full of bloom as in early spring; the other three 1895 novelties had not a sign of a bloom on them.

We are still without a satisfactory yellow perpetual-flowering Carnation. None of the existing sorts in cultivation, such as Buttercup, Bouton d'Or, Eldorado or Goldfinch, can be classed as clear yellows, and very few people are able to grow them satisfactorily. Probably Eldorado is the freest-flowering sort yet sent out of this class, but there is much need of a variety which is free from streaks and pencilings of carmine. The border section of Carnations, which do so admirably in Great Britain, are not successes here, owing to our hot, dry summers. Immense improvements are being made year by year in this class; the flowers average considerably larger than those produced on our plants under glass in midwinter, and are of almost every conceivable color; some kinds are very weak in the calyx, which is due in large part to the cooler and moister atmospheric conditions existing there. Among yellows there are some grand clear varieties with large flowers and very stout calyxes; the best we have seen of these are Corunna, Miss Audrey Campbell, Louis Philippe and Germania; the last named has been several years on the market, while the others are last season's introductions. We have nothing to equal these varieties in America to-day; of course, they are not perpetual-flowering sorts, nor will they stand our rigorous winters, but wintered in cold frames there ought to be a future for this beautiful section of Carnations. Our American raised varieties do very unsatisfactorily in Great Britain. Lizzie McGowan, William Scott and Portia were the only sorts we saw last July while over there, and they compared unfavorably with English and French raised varieties of the perpetual-flowering class. We found some growers who were handling the border varieties in pots, and by gentle forcing were having a supply of flowers for two months before any could be picked outdoors. One or two skilled growers informed us that they hoped within a few years to have a race of Carnations by crossing the perpetual and border varieties, as they are now doing, which would be perpetual bloomers even in so fickle a climate as that of England.

Malmaison Carnations have come greatly to the fore in Great Britain of late years, and on some private places we noted several houses devoted exclusively to their culture. They are not perpetual-flowering; the flowers are very large, being sometimes nearly six inches across, but they usually burst the calyx; they are popular for boutonnieres and command high prices at all seasons. We have been unable to do anything with them in America and cannot call to mind any one who has been able to grow and bloom them satisfactorily. They are usually short-stemmed and would be of no value here except for button-holes, and would not produce sufficient flowers to be profitable to the grower.

Taunton, Mass.

W. N. Craig.

Violets.

AT this season of the year the greatest growth is being made by the Violets, and it often seems a pity that they must be moved just as they appear to be enjoying the cool nights, but we have found that to delay housing them is often fatal; the heavy night dews seem to be laden with disease germs that soon develop the dread spot on the foliage, and it is a difficult matter to get rid of it when once it has a foothold so late in the year. Even in frames we have never been able to keep out the disease; it has always done more or less damage before the arrival of cold weather, and we have to wait until spring for the crop that should have been produced in midwinter; but where a bench in a cool house is at disposal, one is sure of Violets at all times, no matter what the state of the weather is outdoors. The ordinary bench, as built for Roses and Carnations, is not deep enough for Violets, which are deep-rooting plants, and a bench constructed of a board twelve inches wide is none too deep. Having a good depth of soil does away with a good deal of danger from decay from a surplus of moisture in dull short days, for a body of soil a foot in depth does not easily dry out in midwinter when once well moistened, and when the soil is in this condition it is easy to keep the surface somewhat dry so that the flowers that lie near it will not be lost from damp. If a layer of clean sharp sand is placed all over the soil it will aid materially in this respect, and it will also aid the young runners to root freely. At this time we make cuttings of the runners for the next year's crop; it is aimed to get them off the plants before fire-heat is

applied in the house, and soon enough to get them all rooted before the winter sets in. A compost of half leaf-mold and half sand is used, and the runners are set thickly in boxes, well watered and placed in a shady cool frame, there to stay all winter. They are frozen up for at least six weeks every winter, but this does not harm them if the frames are kept closed until the arrival of warmer days, and the rooted plants are kept in the boxes until it is time to put them in the open air to harden off, and they are planted in their summer quarters some time at the end of April or early in May. Plants that we have now have not known what it is to be subjected to fire-heat for several years, and I find that the expe-

the result has been in each case that they were an easy prey to disease, and we have now a number of the variety sent out as the Farquhar that seem predisposed to spot, although they were obtained from stock that was perfectly clean with the grower last winter from whom they were purchased.

All remedies tried up to this season have been of no avail to even check the spot, but this autumn we are trying Sulphonaphthol, a preparation sent out as a disinfectant, insecticide and germicide. For the first purpose it is excellent, the second very dangerous, and for the third use, at present writing, seems promising. It is used in a one per cent. solution with water, is easily soluble, and if effectual will be a cheap remedy for a trouble that has hitherto baffled all who have tried to do battle with it. It would be well for others to experiment also and report their results.

Most people now have tried the Violet California, and the opinions seem varied, to say the least, but we have found it to be a really good single flower, fragrant, of good color and ample foliage. It would seem as if this kind would be worth growing for the foliage alone; it is stout and makes up well with the flowers of other varieties, for most growers are aware that in midwinter good foliage is more difficult to obtain than flowers, and with this fact in view we have decided to try a good frame full of them, for they seem healthy and vigorous so far.

Violets require a cool house; in a night temperature of, say, forty degrees as a minimum, the plants will thrive, and insect pests, as red spider and plant-lice, will not, and if a whole structure cannot be spared for Violets alone, Mignonette will be found an excellent companion plant; the two thrive under exactly similar conditions as to depth of soil and temperature, excepting that it is almost impossible to make soil too rich for Mignonette. The seed should be sown at the beginning of August, but it is not too late now to sow and get good results in winter and early spring months, if some good strain of seed is chosen. Sutton's Giant we have used for a number of years; Allen's Defiance is a very large-growing variety, and if either of these is not to hand Machet is quite satisfactory, although strains of this vary very much.

South Lancaster, Mass.

E. O. Orpet.

Seasonable Flower Notes.

CHIRONIAS are soft-wooded south African representatives of the Gentian family which deserve to be better known. They are herbaceous in habit and succulent in character. The whip-like stems arise from a common root stock, arching away gracefully on all sides. The stems are rather sparsely covered with opposite lanceolate, bluish green leaves. The salver-shaped, rosy pink flowers are produced abundantly along the upper part of the stems. A well-trained plant is a showy object at this season, when flowers of its color for conservatory decoration are uncommon. I saw some fine specimens recently of *C. baccifera* at N. T. Kidder's place at Milton, Massachusetts. The plants were about two feet in diameter and about the same in height, and a mass of bloom. They are essentially cool-house plants, and can be easily increased from soft cuttings.

Allamanda Williamsi has proved to be one of the most valuable acquisitions of recent years. Its dwarf bushy habit commends it for pot-culture. It needs scarcely any training, or even staking. One good stout stake will hold a large plant together. It stands well out-of-doors in either sunshine or shade. Better growth is made in the sun, but the flowers are shorter-lived. Plants which have had a month or two of rest out-of-doors bloom profusely all the winter. It strikes easily from soft-wooded cuttings, and should soon be abundant.

Pyrethrum uliginosum is a common hardy border perennial, and is scarcely thought of otherwise. Cuttings taken in early June, topped once and grown on in seven-inch pots, have made pretty specimens about eighteen inches high, and now covered with Daisy-like flowers. This *Pyrethrum* is rapidly becoming a florist's flower, and since it does so well under glass and has cleaner and better-formed flowers on longer stems, it is safe to say it will be taken up by the florists and grown in the same

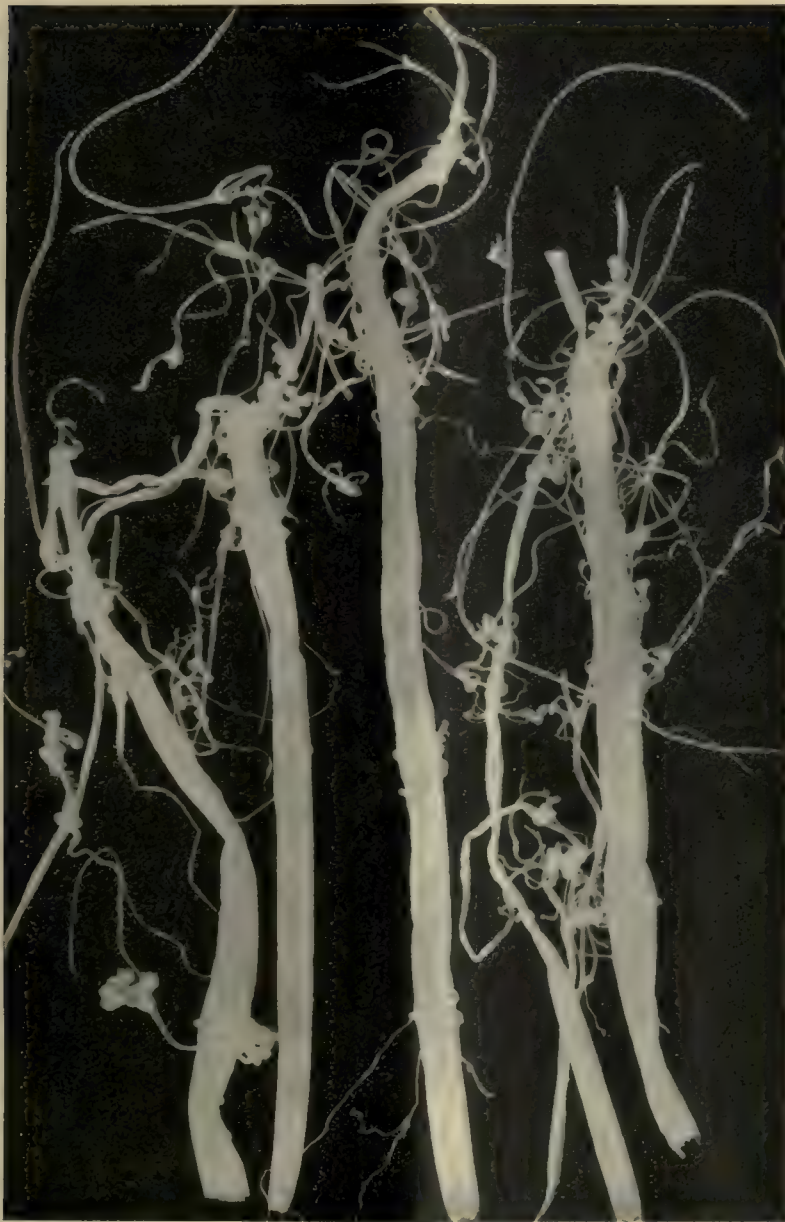


Fig. 49.—Dodder growing on Onion Leaves.—See page 365.

rience of other growers agrees with mine. This does away with spring propagation when time is less easily found for it than just now, and when space in the greenhouses is scarce.

There seems to be no doubt that the ordinary system of cultivating Violets has rendered the plants more susceptible to disease, and this fact was emphasized the past week when I saw a large number of plants in the open field with one of the specialists in this vicinity. He pointed out a row of plants that had been propagated from plants imported from England this past spring, and one would have taken them for a distinct variety, so vigorous were they, but all were Lady H. Campbell, the variety that has given the most successes of any in past years. We, in common with others, have been tempted to try varieties that seemed more desirable on account of color, but

way as *Chrysanthemums*. *Helianthus decapitatus multiflorus*, commonly known as the perennial double Sunflower, is likewise a good pot-plant, but it is so very common that it is not likely it would be used as a pot-plant except in groups for color effect.

Browallia speciosa major is a valuable addition to a genus which includes a number of beautiful annual and perennial plants. *B. elata* is the best known and usually treated as an annual. If seeds be sown about midsummer, and the plants be grown along and stopped into shape, they will flower nicely through the winter months. This new addition is likely to prove just as valuable as a greenhouse plant. The flowers are salver-shaped, nearly as large as those of a single *Petunia*, and deep blue in color.

Nemesia strumosa is a pretty little plant, probably an annual belonging to the same family as the *Mimulus*, which it resembles. There is much variation among the seedlings flowering here. Cuttings have been taken from a good variety, and these are rooted. It is intended to grow them along for winter blooming.

Wellesley, Mass.

T. D. Hatfield.

Correspondence.

The Delaware Peach Crop.

To the Editor of GARDEN AND FOREST:

Sir,—The Delaware peach crop will fall fifty per cent. short of the estimate put upon it in the spring by the railroad officials, who use this estimate as a basis on which to prepare for the transportation of the crop. The crop was not over-estimated at that time, but the shrinkage is due to three distinct causes. The first and primary difficulty was the excessively hot weather during the early spring, the second was the high humidity of the atmosphere throughout the season, and the third was the plum curculio. The intense April heat caused an abnormally rapid growth in the young forming fruit, causing it to attain the size by the last of May not usually reached until the middle or latter half of June, and resulting when the growth again became normal in a weakened constitution in the fruit. The whole peach crop has consequently matured a week or ten days in advance, the fruit only reaching three-fourths its natural size.

The humidity of the atmosphere throughout the growing season and the condition of the fruit itself have been favorable to the development of the peach-rot fungus, which has been so serious that thousands of baskets have been lost. Conservative estimates place the loss from this fungus alone at fifty per cent. of the entire crop. But the fruit alone has not suffered from its attacks, which have been so virulent that the growth of the present season has been seriously blighted. The later peaches are not suffering so seriously, as the atmosphere has cleared and the most favorable conditions for the spread of the disease have been removed.

The third difficulty, the plum curculio, has waged war on the crop, attacking the early peaches more severely than the later varieties. More than half these peaches were stung, and in several instances ninety per cent. were found wormy. The curculio was probably present in greater numbers than usual this spring, owing to the large number bred in the crop of last year, and to the winter and spring which were favorable to an unusually large number of the beetles coming through alive.

The probable explanation of the abundance of worms in the ripe fruit is to be found in the fact that there was no "June drop" this year, which is mainly caused by the larva of the curculio and by the imperfect fertilization of the flowers. The larvæ were present in the young peaches, which, however, were being forced so rapidly by the hot weather that they were strong enough to remain on the trees, in spite of the weakness caused by the curculio, and the "June drop," which eliminates a large proportion of the wormy fruit, has been harvested and sold with the rest of the crop.

The question naturally arises, could this loss of half of the Delaware peach crop have been averted? The only answer that can be made to the inquiry is, that it has been demonstrated, over and over again, that the curculio can be practically controlled by jarring the trees during the egg-laying period, which extends about six weeks from blossoming-time, and that thorough and persistent spraying with fungicides will reduce the loss from peach-rot to a minimum—yet five per cent. of the peach-growers have practiced neither this year.

Delaware has been fortunate for several years in not having severe losses from these two causes, and the growers have practically stopped spraying, but experience has taught the

lesson that the successful fruit-grower must protect his crop every year, although the conditions do not always seem to warrant the outlay.

Agricultural Experiment Station, Newark, Del.

G. Harold Powell.

The Forest.

The Burma Teak Forests.—VI.

EFFECT OF SYSTEM UPON THE CONDITION OF THE FORESTS.

THE system here described, under which the Teak forests of Burma are worked, is designated by foresters as the system of selection fellings. Single trees are selected for felling among those which have attained marketable size, and the selection is governed chiefly by what is best for the maintenance and regeneration of the forest, and likewise by the question whether, if left standing, these trees are likely to improve in value or whether they will deteriorate. Obviously it is a matter of great importance to ascertain what effect the operations carried on under this system in Burma have had upon the condition of the forest; in other words, whether they have secured the maintenance and regeneration of its most valuable constituent, the Teak-tree.

At the outset it will be convenient to consider what takes place in a forest, like those here described, which is left alone, and from which no Teak is extracted. It has thus happened that a tract in the interior of the hills which separate the Sitang and Iraauidi valleys at the head-waters of the Hpyoo stream was examined by me by means of linear valuation surveys in January, 1868, and that twelve years later, in February, 1880, the same tract was examined in the same manner. On the first occasion in three days a length of seventeen miles, with an average width of 100 feet, or an area of 206 acres, was surveyed. On the second occasion the route was a little longer and the total area surveyed in four days came to 250 acres. The results give the growing stock on 100 acres as follows:

	1868.	1880.	Increase.
First class, 6 ft. girth and upward,	183	249	66
Second class, 4 ft. 6 in. to 6 ft. girth,	162	300	138
Third class, 1 ft. 6 in. to 4 ft. 6 in. girth,	392	657	265
Total Teak above 1 ft. 6 in. girth,	737	1,206	469

This part of the forest had not been worked between 1868 and 1880, and no trees had been girdled. Bamboos and other trees had been cut to a small extent by the Karens living in the vicinity, but the Teak had not been touched. The improvement in the condition of the forest is remarkable. Neglecting trees blown down, or burnt by the annual fires, sixty-six, or forty per cent., of the second-class trees had attained six feet girth in twelve years, from which may be concluded that in thirty years' time the whole of the second-class trees would have attained first-class size. Again, $138 + 66 = 204$ trees, or fifty-two per cent., of the third-class trees (392) had attained four feet six inches in girth, so that in twenty-three years the whole of the third-class trees would have attained second-class size. Equally satisfactory is the increase of the smaller trees. Obviously, by leaving the Teak alone, and by moderately cutting Bamboos and other trees, it would be possible greatly to increase the proportion of Teak in a forest of this description.

So far regarding a forest from which no Teak has been extracted. In order to understand the changes which have taken place in a forest regularly worked under the system here described it will be necessary to consider those districts for which special working plans have lately been prepared. It has already been stated that special working plans have been prepared for eleven forest districts in the Iraauidi valley. These districts form a continuous belt of forest on the hills east of the Iraauidi River, with a few outlying blocks in the plains, extending over ninety-eight miles from north to south. The entire area has been demarcated as reserved forest, and it aggregates 652,569 acres. The growing stock of Teak of the different age classes has been determined by examining a large number of sample areas, 2,105 in number, averaging sixty-two acres each, carefully selected, so as to furnish a correct representation of the different descriptions of forest in each district. It must be distinctly understood that the remarks which follow only relate to the eleven districts in the Iraauidi valley. The area, however, sixteen per cent. of the total area of reserved forests in Burma, is sufficiently large to admit correct conclusions being formed.

The first step in preparing a proper working plan is to divide the forest into compartments of manageable size, which on the hills must be formed in accordance with the configuration of

the ground. When the earlier, summary and necessarily very rough working plans were prepared, the provisions of which have been explained in these pages, they related to the whole country, and the units of management at that time were not compartments, but districts. Accordingly, each of the eleven districts, for which the special working plans were made, was divided into compartments. The aggregate number of these compartments was 1,023, with a mean area of 639 acres. The growing stock in each compartment was separately estimated on the ground of the sample areas mentioned. In the case of one small forest district in the plains the whole of the trees in that forest were enumerated; in the other ten districts the growing stock on the sample plots only was counted. The aggregate area of these sample plots was twenty per cent. of the total area of the ten districts.

On the ground of these data the growing stock of Teak-trees of the different size classes was determined on the area in question, with the following result in regard to the two largest classes:

First-class trees, in girth 6 ft. and upward,	427,800
Second-class trees, in girth 4 ft. 6 in. to 6 ft.,	437,700

These surveys were made between 1884 and 1892. In 1868 an estimate of the first-class trees then standing in these forest districts was prepared on the ground of the linear valuation surveys that had been made up to that date, supplemented by the personal knowledge of these districts, which the local forest officers had by that time acquired. The valuation surveys made in 1868 justified the assumption that at that time the number of the second-class trees amounted to three-fourths of the first class. Hence the growing stock of the two largest classes in these forests in 1868 was:

First-class trees, in girth 6 ft. and upward,	382,000
Second-class trees, in girth 4 ft. 6 in. to 6 ft.,	286,000

From 1868 to the time when the special working plans were prepared, 110 trees were girdled in these districts. There has, therefore, been a large increase in trees of the first and second class. The number of second-class trees which have attained first-class size has been $110,000 + 46,000 = 156,000$. This is fifty-five per cent. of the second-class trees in 1868. From 1868 to 1889 (the mean year of the new valuation surveys) twenty-one years have elapsed, hence in these districts $21 \times \frac{1}{25} = 38$ years would be sufficient to bring up the whole of the second-class trees to first-class size. The aggregate number of trees that under the special working plans will hereafter be girdled in these districts is 11,230, which is one-thirty-eighth of 427,800. Too much weight must not be attributed to this coincidence, for the linear valuation surveys, upon which the estimate of 1868 was partly based, were made on three per cent. only of the aggregate area of these districts. But, as already stated, the estimate of first-class trees was supplemented by local knowledge, and probably was approximately correct. The proportion between first and second class trees in 1868 may also be depended upon. In the tract at the head-waters of the Hypo stream, described before, a much shorter period—namely, twenty-three years—seems to be sufficient to bring up the second-class trees to first-class size. These forests, however, are all moist forests with excellent soil, where growth is more rapid. The annual yield of 11,230 trees mentioned above is the aggregate yield of eleven districts. As already explained, the yield was determined for each district separately on the ground of the sample plots examined in each compartment and on the ground of the rate of growth determined for each district. Upon these data the yield of the southernmost district, Thonzay, was, for instance, fixed at 1,000, or one-twenty-fifth, of the first-class trees, while that of the northernmost district, Nawin, was fixed at 2,400, or one-forty-second, of the total number of first-class trees. The improvement which has taken place in the condition of the forest area to which the present remarks relate—that is, of the eleven forest districts for which special working plans have lately been prepared—is, as we have seen, marked by the increase of Teak-trees belonging to the larger classes; it is equally marked by the increase of the smaller classes below four feet six inches in girth. Here we must compare the results of the older valuation surveys as they stand:

From 1857 to 1868 were counted on . . .	} 647 trees below 4 ft. 6 in. girth per 100 acres.
14,592 acres, . . .	
From 1884 to 1892 were counted on . . .	} 796 " " " " "
131,287 acres, . . .	

In order to facilitate comparison, the figures have been reduced to 100 acres. The older surveys were linear. In those days the object was to explore large forest areas within the shortest time possible. Accordingly, paths were necessarily followed wherever such was feasible, and in a hilly

country these paths in Burma generally lead along the crest of ridges, or along the bottom of valleys, and in such places Teak is frequently more abundant than on the slopes. Hence, while carefully selected sample plots correctly represent all descriptions of forest, the old linear-valuation surveys necessarily gave the contents of the richer Teak localities. Hence, when the first-class trees standing in the districts here described were estimated in 1868, in order to determine the annual yield of these forests, the number obtained by means of the linear surveys was considerably reduced—by more than one-half. The practical result of the figures given is, that average forest tracts are now better stocked with Teak in girth below four feet six inches than the better Teak localities were stocked, say, twenty-five years ago.

What has been here advanced will have demonstrated that under the system initiated in 1856 a great improvement has taken place in the forest districts here specially referred to, and that the growing stock of Teak of all ages has considerably increased.

Bonn, Germany.

Dietrich Brandis.

Exhibitions.

The Boston Flower Show.

A GOOD autumn flower show never lacks for brilliancy, and the exhibition of the Massachusetts Horticultural Society at Boston last week was unusually striking in the abundance of glowing color displayed. Even the foliage plants were unusually bright. Dahlias of all classes were out in great force and in unusual perfection of form, and, of course, Cannas were equally in evidence. Sunflowers and Marigolds gave all the yellow that was needed, while Phloxes, Fuchsias, Asters, Zinnias, Tropæolums, Cockscombs, Japan Lilies, Pinks, Salpiglossis and five large collections of wild flowers added variety as well as richness to the display. The Glory Pea, *Clanthus Dampieri*, is by no means a novelty, but it is so rarely seen in this country that the well-developed scarlet and black flowers shown by Mrs. Wellington attracted unusual attention. But, after all, the aquatics seemed to have the strongest allurements for most of the visitors, and really they deserved special study. We hope to give some detailed description of these plants and of other leading features of the exhibition, but at the time this is written we have only space to say that for the general display of *Nymphæas*, *Nelumbiums* and other aquatic plants, including not less than twenty-five blooms of *Nymphæas*, John Simpkins, Esq., of Yarmouthport (James Brydon, gardener), received the first prize, and Oakes Ames, Esq. (Carl Blomberg, gardener), received the second prize. Mr. William Tricker also brought from the Water Gardens of Henry A. Dreer a magnificent collection of various blooms in thirty-five varieties, which were not placed in competition, while L. W. Goodell, of Pansy Park, had a fourth collection of the choicest-named varieties, which was also considered as a non-competitive trade exhibit. The arrangement of the great masses of decorative plants was unusually good, and a large proportion of the specimens had individual merit.

Some of the principal prizes taken were by Dr. C. G. Weld, John L. Gardiner and J. W. Howard for Palms; G. A. Nickerson, N. T. Kidder, Jos. H. White for collections of foliage and greenhouse plants; George McWilliams for *Caladiums*; James L. Little for Cannas; James Comley for Zinnias; Mrs. P. D. Richards and Miss Genevieve Doran for collections of native plants; J. W. Manning for hardy coniferous trees. Mr. Robert Cameron also brought a well-selected group of plants from the fine specimens in the Harvard Botanical Gardens.

Notes.

Mr. Joseph Meehan writes that trees of *Quercus Prinus*, the Rock Chestnut Oak, are loaded with acorns this year beyond precedent in the neighborhood of Philadelphia. The branches are actually bending under the weight of their acorns, just as overloaded fruit-trees do in an orchard. This Oak is always a handsome tree, and its firm, yellow-green, chestnut-shaped leaves, being glossy above and pale, downy beneath, give it an appearance of singular richness in the sunlight. It grows to a large size and attains a great age.

The freight on a barrel of apples from this port to Liverpool averages about fifty cents. There are small charges there for insurance, sampling, etc., which amount to something like fifteen cents, in addition to the five per cent. which is charged for selling the apples at auction. A sample of two barrels is

taken from every lot of twenty barrels or less. One of these is opened at the "face" end and the other is turned out in baskets, so that buyers can detect at a glance any dishonesty in packing. The trade has been going on long enough now to give an opportunity for growers and packers here to establish a reputation, and many brands of apples are now sold almost entirely on their reputation for honest packing, uniformity and soundness.

Mr. Howard, the entomologist of the Department of Agriculture, has just issued a circular on the general appearance and work of the larger Corn-stalk borer, *diatraea saccharalis*. This pest, which tunnels and destroys the stalks of growing Corn, rarely does any sweeping injury except in sections where Corn is replanted on the same ground for several successive seasons. Since the insect bores downward through the old stalks to the tap-root and passes the winter a little below the surface of the ground it will increase year by year, and when abundant it often ruins half the crop. It is the same borer which attacks Sorghum and Sugar-cane, and the way to keep it in check is by a rotation of crops or by thoroughly dragging off the stalks and stumps in the fall after the corn is cut or pulled, and burning it.

A well-informed writer in *The Gardeners' Chronicle* speaks with enthusiasm of the capabilities of Australia, and especially of New South Wales, for fruit-growing, where millions of acres are suitable for the production of almost every description of fruits that can be grown in temperate and sub-tropical countries. Oranges and lemons of all varieties grow well, and they can be delivered in London during those months in the year when there is no supply from Spain or other southern countries. Table grapes in great variety can be profitably exported when packed as they are in Portugal and other countries, while the opportunities for wine-making are almost unlimited. There are also possibilities of building up a large export trade in raisins, dried currants, figs and other staples peculiar to the isles of the Levant and the Grecian peninsula.

What is to be the final verdict upon the usefulness of the Wineberry as an ornamental and useful plant? We have very contradictory reports concerning it in this country, and now a correspondent of *The Garden* writes from Dublin that this *Rubus Phoenicolasius* is there attractive at all stages, from the time of the formation of its long crimson-bearded flower-buds. After the flowers fall, the young fruit, at first yellow, then orange, then red, then ruby color, contrasts beautifully with the leaves, which are deep green above and pure white beneath. The fruit, which ripens in Ireland about the first of August, is said to be a welcome addition to the dessert at the time when other fruits are mostly over, and, in addition to this, the plant is perfectly hardy. Is it not possible that by selection or hybridizing this plant may be improved in various directions?

In a bulletin on fodder and forage plants issued by the Department of Agriculture, it is noted that the common Yarrow, *Achillea Millifolium*, which is found everywhere in old fields and meadows in this country and usually considered a weed, is held in England to be a very valuable addition to sheep pastures. A correspondent in Toronto inquires why this would not be a good lawn plant. He has observed patches of the plant here and there in Canadian parks, which were fresh, green and aromatic, contrasting favorably with the dry and shriveled appearance of the surrounding grass during the dry weather of early spring. The trouble would be that it would lose all its grace when the mower ran over it, even if the blades were set high so as to snap off only the leading shoot above the lower leaves, and the lawn would have a stubby look. But it must be admitted that a lawn which could be kept covered with the graceful lower leaves of this plant would have not only a novel but singularly beautiful appearance.

The novelty in the fruit market this week was the arrival of the first of the new crop of Jamaica oranges, which for their rarity, or, certainly not for their intrinsic value, were all taken by the fancy fruiterers. A few new Japanese persimmons have reached here from California, but, of course, they are inferior in size, color and quality. A limited quantity of well-colored cranberries have reached the city, and they command \$6.00 a barrel, although most of those that yet come are light-colored and cheap. Of the pears, the best now are the so-called Mountain Bartlets grown on the Highlands about Vacaville. They are of large size and delicious flavor, and, in spite of the abundance of fruit, cost sixty cents a dozen. The finest Alexander, Gravenstein and Duchess of Oldenburg apples bring at

wholesale \$2.00 a barrel. Owing to the small size and inferior quality of the Delaware peaches this year, California peaches compete with them at no disadvantage and are worth quite as much. Among the plums, Kelseys are held to be the richest and best in quality as dessert fruits, although they are a trifle over-sweet and of medium size. Well-ripened and fair-sized fruit brings fifty cents a dozen.

Mr. W. H. Jenkins writes to *The Country Gentleman* that he lately sent some fine bunches of celery to a fashionable summer hotel and received \$30.00 for the product of a square rod. The plants were set at an average distance of a foot apart—that is, in two rows six or seven inches apart—then an eighteen-inch space, and then another double row. Wide boards were set on both sides the double rows when the plants were half-grown, the space between was mulched with manure and other material which would hold moisture, water was turned on from a neighboring brook and the ground was kept thoroughly wet. One could almost see the Celery grow, and when the plants were about full size the boards were crowded close together, and in mid-August there was a large growth of well-blanching celery. Of course, this method will not succeed except on the richest soil, and when the rows are close irrigation is indispensable. Three times as much Celery can be grown on the land as by the old method of setting in rows wide apart, while in double rows only half as many boards are needed. There is no earthing up to make expense and soil the stalks, while the mulch keeps down the weeds and retains the moisture, so that less water is needed.

The experiment of shipping California green fruit to London can hardly be pronounced a success as yet, but perhaps with improved methods of cooling or sterilizing the air it may be possible to deliver in London fruit which has been picked in California after it was reasonably matured. California papers insist that the experiment should be persisted in, because the young trees that are coming into bearing within the next two years will certainly double the fruit production of that state. Some new outlet must, therefore, be provided for the fruit since the demand in eastern cities will certainly not increase so rapidly as to absorb the whole Pacific coast supply that is not used home. Oranges make up the leading product in the southern part of the state, of course, but of the thirty million fruit-trees in the state, a little more than half of which are in bearing, the prune is already the leading product, while the young trees that do not yet bear are three times the number of the bearing trees. Apricots too young to be productive outnumber the bearing trees, also, by two to one, and are among the three leading fruits in five out of the seven southern counties. The orchards of Apples, Pears, Peaches and Cherries are increasing in acreage every year, so that conservative growers are beginning to wonder who will consume the thousands of tons of fruit which are looking for an eastern market.

William E. Meehan, who was a member of the Peary Relief Expedition, writing to *The Independent* of flowers in Greenland, says that a few miles north of Robertson's Bay there is a plateau about a mile long and one-fourth as wide, with a precipitous face to the sea, and on the other side lichen-covered cliffs rising to a height of three thousand to five thousand feet. The top and sides of this plateau is a mass of flourishing vegetation, chiefly of Grass, which when one walks through it reaches above the knee. Among this verdure, Buttercups, Poppies, Cinquefoil and Dandelions thrust their golden heads in wild profusion, and yet beneath it all is part of a dead glacier, a bed of ice, which forms the plateau. The explanation of this remarkable phenomenon is that the progress of the glacier was really arrested years, perhaps centuries, ago, when Mosses, which brave any temperature, began to creep slowly over the mass of ice, which was then perhaps fifty or more feet thick, making their way first in thin-net-like layers, and then as they gathered strength in thick masses till they reached the edge which fronted the bay. Here, as the sun each summer slowly melted the face of the ice, they matted themselves firmly and dropped over lower and lower until they reached the rocky shore, and the huge block of ice was completely hidden. Then year after year the Moss flourished, the young plants trampled the older under foot until the latter decayed and turned into rich mold and buried the great mass of ice deeper and deeper. Then Grass seeds found their way among the Moss, blown by winds or carried by birds. These germinated and increased, and by their greater vigor in turn almost blotted out the Moss. To finish the picture, blooming plants took up their abode and flourished. Every summer now the plateau is a garden of green and gold and white.

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The Garden in Autumn.

IT is constant change which gives to a good garden its unfailling freshness. It is not repeated over and over from day to day, but transformed from one beauty to another as the year progresses, so that its attractions never become stale or wearisome. One of the fundamental objections against carpet-bedding is its uniformity; all summer long it presents the same figures and the same colors, the same unvarying expression. Flowers bloom and fade, leaves expand and the tender tints of spring pass through the deep greens of summer to the rich glow of autumn, but clipped Coleus and Alternantheras show the same long lines of scarlet and yellow until one tires of looking at the monotonous pattern, while all about it is progression and vicissitude. The part of the garden given over to one of these invariable designs takes no account of the wondrous procession which keeps moving all about it to the close of the year, but where planting has been well considered the garden has a special charm for every season, and a vital relation with all the processes and appearances of nature which environ it.

As the year ripens in early autumn the garden can be made to glow with a richer color than at any other season. But as the season closes there comes a time when all the landscape is purpled with wild Asters or aflame with Golden-rod, when every strip of woodland and the shrubs in every thicket, and even the weeds of the fields and waysides, glow with colors with which no garden can hope to compete. Then at last comes a day when many of us feel inclined to let our gardens go the natural way of all vegetation. Some efforts may be put forth to save a few of our tender plants from approaching frost, and in this way our sympathies may be stirred to a renewal of our interest, but usually we let the garden alone to die as gracefully as it may. Alfred Austin, the British laureate, states the case with more poetry than is found in many of his verses, when he writes:

There is an orderly negligence, a well-thought out untidiness, a secret of careless grace about autumnal forms and colors which no other season can match. Even to the garden proper, autumn adds such wonderful touches of happy accident that when it really comes a wise man leaves his garden alone and allows it to fade and wane and slowly and pathetic-

ally pass away without any effort to hinder or conceal the decay. Indeed, it would be worth while having a cultivated garden if only to see what autumn does with it.

It is November, however, before this time comes hereabout, and, as a matter of fact, one who really knows his garden sees growth and beauty until the ground is frozen hard, and, indeed, all winter long whenever the surface is bare, on a sunshiny day he will be watching the movements of those sturdy things which are getting ready to flower as soon as the days begin to lengthen. Certainly there is no season when material for giving true beauty to our grounds is more abundant than that which is available just now; and yet, it must be admitted, we do not make as much of our gardens at this season as we might. One reason may be that the best of the herbaceous plants which flower at this season require to be cared for all summer long. The early spring-flowering bulbs are planted in autumn and left alone all winter, and then they bloom without exacting any more attention; while, if we are to have flowering Chrysanthemums, or Cosmos, or Japanese Anemones and many more, we must keep them watered and hoed and staked and tied and sprayed for months. But certainly the results of such care will repay all the outlay, and the notes of Mr. Watson, Mr. Gerard and Mr. Hatfield in this number invite attention to the wonderful display which we may have if we are willing to take the pains.

Already the leaves of some of the shrubs and trees have begun to change, and if we have studied the subject we know that individual trees have special beauties in this direction which can be propagated, and we can make brilliant pictures now and for the weeks to come by harmoniously grouping those which have striking features. There is no need to speak of our Oaks and Maples and Tupelos and Liquidambers, nor of the smaller trees like Sassafras and Sorrel and Dogwood, or of the shrubs like our Yellow Root with its scarlet and orange, our high Blueberries and other Vacciniums, Leucothoës, Viburnums, Sumachs, Rhododendron Vaseyi and many of the Asiatic Spiræas, all of which have been described over and over again in these columns; and then there are the shrubs like the Hollies and Winter Berries, Thorns, Barberries, Viburnums, Cornels, Honeysuckles, Roses, Climbing Bitter Sweet and its Asiatic relative Celastrus articulata and many more, whose fruits are as bright as their blossoms. With proper care it is plainly possible to make selections from these trees and shrubs and group them so as to form masses of richly colored fruit and foliage in autumn. Of flowering plants in early autumn, we have our native Lobelias, Hibiscus and Asclepias, with at least a dozen Sunflowers, the Silphiums, Boltonias, Rudbeckias and Asters, Vernonnias, and with them the great Groundsel (Senecio pulcher), the Mountain Fleece, Trycirtus, the autumn-flowering Monks-hood, the pyramidal Bellflower, and climbers like the late Clematises. Mr. Gerard and Mr. Watson call attention to the singular charm of certain autumn-flowering bulbous plants. We may add that many biennials and perennials like Delphiniums, Gaillardias, Pentstemons and Iceland Poppies, if the seeds are sown in January and planted out in spring, can be had to bloom in autumn.

Naturally, these autumn-flowering plants are taller than those of spring, having had all the summer to grow in. Some make great masses from six to ten feet high and of corresponding girth. No one, for example, who has not seen a well-grown Boltonia can appreciate how effective a full-sized specimen becomes when set in rich deep soil and properly cared for. The spring garden, it is true, has all the charm of a new creation. The flowers have a delicacy and dainty grace which make them especially delightful in the wild weather which they brave, and our senses have not been sated with a long season of familiarity with all the treasures which the garden has had to display. They have no rivals, but gather an additional interest from the fact that they are a promise of what is to come. Still, our autumn flowers have a stateliness which is theirs alone. They harmonize with the rich, mature beauty of

the landscape. They come also to grace the most delightful weather of our northern year. After our uncertain and often disagreeable spring and the oppressive heats of summer these bracing days make life out of doors a constant delight, and one can imagine no more favorable conditions for enjoying a garden than those furnished by an American autumn.

The Alpinum in the Botanic Garden of Tübingen.

DURING a brief period of work in the Botanic Institute at Tübingen during the summer, by the courtesy of the director, Professor Vöchting, I had ample opportunity to examine the construction and become familiar with the details of management of what, in many features, is the most remarkable alpinum in the world. The Botanic Garden, in which it is situated, lies in the north-eastern quarter of the small university town of Tübingen, on both banks of the Ammer, a small stream which empties into the Neckar, a short distance away. The garden has an elevation of about 1,000 feet, and near it are many hills covered with forests of Pine, which rise 250 to 300 feet above it, while to the southward, twenty miles away, the Swabian Alps reach a height of 2,500 feet, in consequence of which the night temperature falls far below that of the day. A latitude of $48^{\circ} 30'$ north, a low winter temperature of — thirty degrees, Centigrade, a summer limit of twenty-five to twenty-eight degrees, Centigrade, help to make a climate which resembles that of southern Michigan in many respects.

The alpinum is laid out in the north-western part of the garden, on a rectangular plot of ground 190 feet in length and nine feet in width, near a stone wall seven feet high and parallel to its length. On this plot are piled the rocks and soil necessary for the culture of the plants, in an uneven ridge, which in one place is six feet in height. The materials used were principally the native stalactitic limestone and gravelly soil, and granite from the Black Forest forty miles distant. The limestone is peculiarly suitable for lower alpine plants and lithophytes, furnishing as it does innumerable cavities for the reception of soil and secure foot-hold for plants which cling directly to the rock. It has been found that the species from the higher European Alps refused to grow on such rock, and hence the granite was procured for the construction of the section devoted to this group. The entire structure is in many respects an admirable imitation of an east and west mountain ridge. The northern side affords many shaded crevices, and more or less shade to the whole is given by a number of small trees near by.

The most difficult problems which have confronted the gardener in the construction and management of the alpinum have been those connected with the water-supply. The water content of such rocky soils is, of course, extremely small and needs almost constant replenishment. In nature this is done by the water from the melting snows above. Here it has been accomplished by a system of branching pipes with many openings below and above the surface, and a flow is allowed during the greater part of the day. The drainage is carried away by cement conduits, and in one place forms an alpine lake eight feet in length and five feet in width, which furnishes in its waters and on the overhanging cliffs admirable conditions for a very rich flora. Near the lake are growing several specimens of Edelweiss, which here becomes somewhat longer-stemmed than on its native cliffs, or in the alpine gardens where it is cultivated to satisfy the thirst of the tourist for mementos of "hazardous" ascents.

Many of the alpine plants are quite intolerant of lime salts and grow best on the granite rocks, but the water-supply used here is taken directly from the city system and is very richly charged with these salts, and, as a consequence, the culture of some of the plants of the higher slopes is impossible. This difficulty might be overcome at some cost by a system of tanks for the storage of rain-water, which would furnish exactly the natural conditions for a large number of species.

It is somewhat surprising to learn that on this area of about 2,000 square feet more than 1,200 species are successfully cultivated, almost all of which are perennials. In some places three, and even four, kinds are grown on a square foot of actual surface—a striking example of a form of intensive cultivation. It must not be supposed, however, that none but alpine species are grown. A glance at the list given below will show that many are at home far southward in the temperate zone. As a matter of fact the alpinum offers a wider range of conditions than any other method of cultivation, and in some form similar to that described might offer suitable conditions of growth for species fairly representative of the flora of America north of Texas, exclusive of trees.

The following list is copied at random from the labels, and comprises many rare species. In some instances a species will be found growing, properly labeled, however, outside of the section devoted to its habitat. Very naturally the section devoted to the European Alps is richest in forms growing at great elevations, as at present the opportunities for European gardens to procure living specimens from the higher American regions are somewhat limited.

The following are the names of some plants grown in the different sections of the alpinum:

NORTH AMERICA.—*Sedum stenopetalum*, *Draba incana*, *D. borealis*, *D. rupestris*, *Geum triflorum*, *Saxifraga cuneifolia*, *S. Pennsylvanica*, *S. bronchialis*, *S. stelleriana*, *Heuchera pubescens*, *H. sanguinea*, *Potentilla villosa*, *Cypripedium montanum*, *C. arietinum*, *C. pubescens*, *C. candidum*, *C. spectabile*, *C. acaule*, *Phlox nivalis*, *Oenothera pumila*, *Dicentra Canadensis*.

ASIA: HIMALAYAS.—*Sedum Kamschaticum*, *S. Asiaticum*, *Primula auriculata*, *P. Japonica*, *P. denticulata*, *P. erosa*, *Aster alpinus*, var. *Himalayensis*, *Androsace sarmentosa*, *A. lanuginosa*, *Gentiana Thibetica*, *G. septemifolia*, *Rehmannia Chinensis*, *Leontodon Himalayensis*, *Hepatica Valdensis*, *Artemisia stelleriana*, *Polygonum Brunonis*.

EUROPE: ALPS.—*Soldanella alpina*, *S. pusilla*, *S. minima*, *Gymnadenia odoratissima*, *Sempervirens crassicaulis*, *Cystopteris alpinus*, *Achillea alpina*, *Ranunculus alpestris*, *Erigeron neglectus*, *E. alpestris*, *Chrysanthemum alpinum*, *Pinus pumila*, *P. cembra*, *Saxifraga aetnoides*, *S. densa*, *Campanula thyrsoides*, *Mulgedium alpinum*.

Philadelphia, Pa.

D. T. MacDougal.

The Sand Dunes of Northern Indiana and their Flora.—II.

ONE of the first plants to appear on the higher dunes is the Bug seed, *Corispermum hyssopifolium*, an annual, somewhat succulent, bearing a thin, flat, winged seed, which is readily moved about by the wind. Its low stature and sparse narrow leaves catch but little of the wind, so that it is easily established. In more favorable localities it has a dense round head, and when torn from the ground in autumn becomes a Tumble-weed, which helps still further to disseminate it. The first of the Grasses to start, and among the earliest plants to gain a footing, are *Calamagrostis longifolia*, *Panicum virgatum* and *Amphipha arundinacea*, the Sea-sand Reed. The last is more common at lower levels among the beach-sands, but it comes up the sides of the higher dunes near the shore, and is found upon their tops. Grasses which come in later are *Andropogon scoparius*, *A. fureatus*, and the nearly allied *Chrysopogon nutans*, always a welcome sight, with its graceful panicles of russet silky spikes. *Elymus Canadensis*, especially the variety *glaucofolia*, frequently grows with the *Calamagrostis* and the Sea-sand Reed, and shows very large curving or nodding spikes of pale green. To these Grasses will be added subsequently species of *Sporobolus*, and in open but more sheltered places in the woods the small annual, *Festuca tenella*, thickly covering the ground in spring and early summer with a dense growth of low wiry stems. Common also are two closely related and pretty species, *Eatonia obtusata* and *Koeleria cristata*. Very interesting, from the behavior of its fruit, is the Triple-awned Grass, *Aristida tuberculosa*, its awns conveniently arranged to anchor the seed and force it into the sand as

they change hygroscopically. Quite similar in the action of its fruit is the Porcupine Grass, *Stipa spartea*, with a sharp, spear-like seed and long twisted awn, which, like a lever, gains some vantage-point to push against, and, as it twists and turns, crowds the sharp-pointed, barbed seed into the ground.

The most abundant trees are the Black Oak, the White Pine and the Banksian Pine. Together they constitute nine-tenths of the arboreal growth on the higher hills. The White Pine, being subject to the strong winds, develops a short, stout trunk, sometimes reaching a diameter of two and a half feet. The branches come low down and form an oblong or roundish top. In places where they are most crowded or better sheltered they make longer trunks, but these are usually small and the trees of comparatively low stature. The Banksian Pine is scattered about everywhere, but does not form the dense groves and nearly exclusive growth by which it characterizes some of the lower sand ridges or more level areas. The Black Oak, *Quercus velutina*, is almost the sole occupant of many places, for it more easily survives the fires which sweep over the forest-land and destroy the resinous Pines. If the trunk is killed or the trees are cut down for wood, the younger and more vigorous soon form a coppice and reclothe the ground. The acorns, easily buried in the sand, often sprout abundantly in a wet season. The White Oak, *Q. alba*, is next to it in frequency, and forms a low, stout tree. The Bur Oak is seen in limited numbers, and occasionally the Red Oak. The Scarlet Oak may also be present, but I do not find satisfactory evidence of it, though it is naturally looked for on such sandy land. But the representatives of the Black Oak group of Oaks in this vicinity are so exceedingly variable, and approach each other by so many gradations of character, that it would be rash to pronounce definitely upon such a point.

The common Basswood seems quite out of place with such an environment. When present it is generally established on sheltered slopes or in narrow ravine-like depressions left among the hills, but I have seen it forming clumps of bushes in the midst of the Sea-sand Reed and Bailey's Cornel on top of a high dune, which the wind was slowly removing. The Cottonwood, the most common tree, and the first to establish itself on the lower sand reaches close by the beach, also gains a footing on the hills. *Populus tremuloides* and *P. grandidentata* likewise have representatives. The Buttonwood is occasionally seen, very queerly placed, with its pale trunk rising up from the midst of a clump of Juniper, and with the Gray Pine for a near neighbor. The Red Cedar must be added to the coniferous flora, small, but usually picturesque trees when, scarred and torn by the wind, they cling to the top-most edges of a disappearing dune, sturdily holding the outposts.

Among small trees we note *Cornus florida* and the Sassafras, the latter more frequently a shrub. Either as a diminutive tree or shrub the Choke-cherry is quite abundant, very beautiful in spring when mantled in white blossoms, and equally engaging in summer when loaded with clusters of dark crimson drupes, for it fruits very copiously on these sand hills. Sometimes the Juneberry, *Amelanchier Canadensis*, grows with it, adding its white blossoms in spring and red or purple fruit in early summer, a tree or shrub of similar habit.

Chicago, Ill.

E. J. Hill.

Nelumbo lutea, the Water Chinquapin.

THE illustration on page 375 shows a colony of the American *Nelumbo*, or Water Chinquapin, which has been naturalized in a pond in the town of Lynnfield, Massachusetts, some fourteen miles from Boston, and shows what unassisted nature can do in the way of aquatic gardening. It seems that the colony was started some twenty years since by a Mr. Silver, who was visiting a friend living on the shore of the lake. Plants of both the *Nelumbo nucifera* (*speciosa*) and *N. lutea* were used, but the exotic

plant soon disappeared. It did not even survive the first hard winter, very likely because it had been planted too close to the shore.

The group of *Nelumbo* now extends along the shore of the lake some two hundred and fifty feet and into the lake some one hundred feet, and is increasing very rapidly. The plants do not bloom with regularity every year, and such blooms as do appear are rarely allowed to perfect themselves, owing to the ravages of bicycle-riders and other visitors.

Although this plant is not as interesting as the so-called Egyptian Lotus in some respects, yet in many ways it is a most desirable aquatic for ornamental use, and its broad handsome foliage is particularly effective, with its rich bluish tinge of color contrasting so well with the light green under side when disturbed by the breeze. Established clumps are a study for their foliage alone. The wide floating leaves completely cover the surface of the water, serving to emphasize the stately effect of those that are held above the surface by their longer and stouter stems, while the curious unfolding of the young foliage and the opening buds on their sturdy stalks all unite to give an effect not to be found in any other native American plant. The flower-buds stand eighteen to thirty inches above the surface of the pond on sturdy clean stems, and quickly changing from a light green to a rich clear yellow when unfolded. The fully extended flowers are from seven to ten inches across, making a rich contrast with the light bluish green, velvety foliage. No native flower excels them in size except those of the *Magnolia macrophylla*.

No question can be entertained of the hardiness of the plant, and it should prove of high value in ornamental aquatic planting. It ought to thrive wherever the Egyptian Lotus will, and the yellow flowers mingled with the pink ones of the Sacred Bean, as the Asiatic species is often called, would make a pleasing picture. The newer Japanese forms, such as the pure white Shiroman, would lend additional charm to such a group.

This group seems to have been overlooked by most of the local botanists; and has been comparatively unknown up to the present time except to a few, and this furnishes a reason, perhaps, why the clump has increased to its present proportions, as otherwise it would probably have been sadly torn and depleted before this.

Reading, Mass.

J. Woodward Manning.

[We have already given an illustration of a pond in southern Illinois covered with our native *Nelumbo* (see vol. iv., p. 556), and we give this second picture for the purpose of calling more direct attention to this neglected plant. It is by no means rare, being common all through the Mississippi basin and on the border of the Great Lakes, although it is comparatively rare in the east, where it was probably introduced by the Indians, who are said to have used it as an article of food. So far as we know, the only other locality where it is known to exist in Massachusetts is at Osterville, where it was found a few years ago by Professor Farlow. The fact that it is hardy so far to the north and east, and that it becomes easily naturalized, ought to encourage planters to make more use of it, and to stimulate hybridizers to experiment with it as the parent of new varieties. Mr. William Tricker writes that it seems to be more difficult to establish than the Asiatic species, although he has seen it in splendid condition and growing more freely than its relative. An amateur aquatic gardener, near Little Falls, New Jersey, planted some seed in the regular way and set them later with other aquatics in a pond whose bottom was hard clay. The plants grew rapidly and bore freely the second year, their splendid flowers, with shell-shaped petals, of as pure a yellow as those of *Nymphaea sulphurea*. They ripened tubers not extra-large, but solid and sound, and these started well when planted out the next spring. Perhaps the soil may be an important factor in success with these plants, since *Nymphaeas*, *Nelumbiums* and most other aquatics flourish best when the soil is rather stiff. Upon the whole, there seems to be no good

reason why this plant should not be much more generally used, and, no doubt, it would be if it were as well known as the Egyptian species.—Ed.]

Foreign Correspondence.

Autumn-flowering Hardy Bulbous Plants.

THE value of bulbous plants for producing beautiful effects in out-of-door gardens in the months of spring and early summer is generally recognized. I propose to call attention here to a considerable number of bulbous plants which may be most effectively used in what may be termed autumn gardening. During the months of August and September it is possible to have quite a grand display of flowers from bulbous plants of easy cultivation, and one can only account for their scant use at present in gardens generally by believing that they are either unknown or that they are crowded out by commoner plants. Gardening is apt to become stereotyped, the same plants being used for the same places and put out at the same time, year after year, without any regard for change and the pleasure that fresh features in the garden rarely fail to bring.

Probably every one of the plants mentioned below is cultivated in most good gardens, but I doubt if many of them are grown in such quantities as to produce a telling effect, and I know that in some gardens they are coddled in pots or stuck in out-of-the-way corners, where their charms are practically buried. The first time I saw *Crinum Moorei* filling a huge bed in the garden of Sir Trevor Lawrence, at Burford Bridge, now some fifteen years ago, I was astonished by the vigor of the plants and delighted by the hundreds of magnificent heads of large flowers in their full glory in the last week in August. Previously I had only known this *Crinum* as a pot-plant. Twenty years ago we grew *Lilium auratum* in pots for the conservatory, and in many gardens this plant is still known only as a greenhouse plant. Any one who has seen the big beds of it in Mr. Wilson's garden, at Weybridge, or in the Royal Gardens, Kew, knows the difference between this Lily when grown in the conservatory and the many-stemmed tall clumps crowded with flowers that are possible when the bulbs are grown in beds along with *Rhododendrons* or such like shrubs. In Mr. Robinson's garden, at Gravetye, I lately saw a large bed of Ghent *Azaleas* enveloped in the flame-like colors of *Crocasmias*, which had taken entire possession of the space between the *Azaleas*, and was almost a weed in Mr. Robinson's eyes. *Schizostylis coccinea* is generally grown in small quantities in pots, but in a few gardens, where its merits as a late autumn flowering plant for the open border are recognized, it is grown in large breadths and produces in abundance its erect spikes of bright crimson flowers. Even slight frosts do not interfere with its blooming, and I have seen a rich display of flowers in the open air in December.

To obtain such effects as are here described there must, however, be no "skimping"; large quantities of the bulbs must be planted, and planted with judgment. I have never seen the *Belladonna* flower when planted at a greater distance than a foot from a south warm wall, except in the warmer parts of Cornwall. The Jacobean Lily is equally shy of flowering if not humored by the supply of heat at its toes. This plant, however, blooms in spring. The same is true of *Lycoris squamigera* (*Amaryllis Hallii*), which we could not flower in pots at Kew, but which has flowered freely this year in a narrow border under the south wall of a tropical fernery.

The following plants are most effective at Kew in the open air in August and September:

AMARYLLIS BELLADONNA.—Planted in narrow borders against the south walls of several greenhouses in a deep loamy soil. In winter they are mulched with light, well-decayed stable-manure. This affords protection to the leaves which push into growth in early spring and are apt to get nipped by frost. The leaves all wither in July and

the spikes are pushed up in August or September, the bulbs nearest to the wall always leading the way. They should be planted about a foot below the surface (base of bulbs). About every fourth year they require to be lifted, the bulbs separated and replanted six inches apart. The variety *Blanda* is three weeks or a month earlier than the type. The Kew variety is characterized by stout scapes, two feet or more high, many-flowered umbels, and the upper half of the segments colored rich rose-crimson.

LYCORIS SQUAMIGERA.—From what I have seen of this plant it is likely to become valuable in the same way as the *Belladonna* Lily, for it thrives under the same treatment and flowers at about the same time of year. [See pp. 323 and 347 of this volume.—Ed.]

CRINUMS.—The three hardy *Crinums* are *C. Moorei*, *C. longifolium* (Capense) and the hybrid *C. Powellii*. Of the last named there are three forms—the type, which has rose-tinted flowers; *alba*, which is pure white, and *rosea*, which might appropriately be altered to *purpurea*, the color of the flowers being almost crimson. I know no bulbous plants of greater merit than these hardy *Crinums*. At Kew we have large groups of them in beds under the lee of the great Palm house, and they are now beautiful with their tall-stalked umbels of large elegant bells. They increase rapidly by means of offsets, one bulb of the white *Powellii* procured four years ago having increased to fifty strong-flowering bulbs. These plants require deep, well-drained soil and a liberal allowance of moisture in the growing season. They are hardy away from a wall good masses of them being now in flower in the Bamboo garden.

EUCOMIS.—When grown in pots these plants are not considered attractive, but when planted out in rich soil in a position sheltered from wind they produce grand foliage and tall spikes of flowers two or three feet high, like glorified *Hyacinths*. Beds of them at Kew are now very attractive. They require the shelter of a wall, otherwise they should be protected with a cone of ashes in winter. The species grown in the open air at Kew are *E. undulata*, *E. punctata*, *E. Zambesiaca* and *E. regia*. They are all south African.

TUBEROSES.—A bed under the wall of the Palm house was planted last May with these plants, and they are now almost every one bearing a stout spike of flowers. The exceptional heat of the summer may account for this success; certainly I have never seen the *Tuberose* flower like this in the open air, but I ought to add I have never before seen it tried.

SCHIZOSTYLIS COCCINEA.—This south African Irid is quite hardy, and it possesses the distinct merit of flowering late in the year. It ought to be planted on a south border in a light, rich soil and watered during dry weather. We find it a good plan to lift the plants every spring and replant them.

CROCOSMIAS.—I have already mentioned the rich display made by these plants when used in large masses. There are now many varieties of them, thanks to the skill of Messrs. Lemoine, of Nancy. They grow freely in light soil and take care of themselves, although to keep them vigorous they require to be lifted and replanted every three or four years. The giant of the lot is *C. aurea imperialis*, for which we are indebted to Herr Max Leichtlin, of Baden. These plants are most valuable in the flower garden.

LILIUMS.—The best of these for autumn effects are *Auratum*, *Speciosum* and *Henryi*. These are now magnificent at Kew, *Auratum* among the *Rhododendrons*, hundreds, I might almost say thousands of them, tall, stately, their great flowers shining in the sun like enormous stars and exhaling an odor which is most enjoyable in the open air. *Speciosum* is not so tall or so stately, but it ranks next to *Auratum* as a free-flowering effective autumn Lily. *Henryi* has the exceptional quality of extending its flowering season over two or three months; at any rate, it has been in flower at Kew since early in July, and it will be in flower in September—a grand Lily, easily accommodated, stately,

distinct and handsome, all virtues and no vices, so far as I know, and I handled the first two or three tiny bulbs of it that reached this country from China. *L. Formosanum* is flowering in the open now, and it would deserve to rank with the best of the genus were it not for its bad habit of generally dying after flowering.

ZEPHYRANTHES CANDIDA.—This is one of the most delightful little plants in the garden. It grows freely as a substitute for Box edging; indeed, a long border now edged with it used to be edged with Box, and the *Zephyranthes* was planted a few inches inside the box and in front of *Belladonna* Lilies. Here it grew and multiplied rapidly, eventually killing the Box which it has supplanted. The edging is now about a foot wide, and consists of a dense array of dark green rush-like leaves six or eight inches long, which in August and September are accompanied by thousands

sunny border out-of-doors. I do not know if they will bear severe frost, but intend to try them this year. A third species, *Natalensis*, has yellowish, fragrant flowers.

COLCHICUMS.—No picture in autumn surpasses an English meadow studded all over with the pale purple *Crocus*-like flowers of the Meadow Saffron. A similar effect may be produced in the garden by planting the bulbs thickly in grass on sloping banks near water, or where a fair supply of moisture is available. They are employed in this way about the lake at Kew, and also in the wild garden. *C. speciosum*, *C. Parkinsoni* and *C. Sibthorpii* are not sufficiently plentiful to be used in this way, but it would pay any bulb grower to work up a large stock of these three large-flowered handsome species for planting on a large scale.

CROCUSES.—The species of *Crocus* which flower in the



Fig. 50.—*Nelumbo lutea*, the Water Chinquapin, in a Massachusetts pond.—See page 373.

of pure white star-like flowers three inches across. The plant is not injured by frost and it transplants as easily as Chives.

TIGRIDIAS.—All the *Tigridias* of the *Pavonia* or *Grandiflora* section are excellent plants for beds to flower in August and September. They are beautiful with us now, white, cream, yellow, orange and variegated varieties, which have names, but no two dealers' names agree, and if one orders white he will probably get orange or yellow. Still, they are all beautiful, and mixed beds of them are very showy at this time of year. We lift them early in winter and store them in dry sand, replanting in May.

TULBAGHIA ALLIACEA and *violacea* are two elegant little Cape plants with narrow leaves and tall slender scapes of lavender or rose-purple flowers. They flower freely during summer and autumn, and are perfectly happy in a

autumn have not yet come to be used in the garden as their congeners, the spring-flowering species, are, but some of them are certain to become popular for this purpose when once they are procurable in quantity. *C. nudiflorus*, the autumn *Crocus*, a native of English meadows, is a perfect plant for the purpose.

London.

W. Watson.

Plant Notes.

MORUS RUBRA.—Our native Red Mulberry is larger and more handsome than any other species of the genus which grows in a temperate climate. An old tree growing on the estate of Mr. P. J. Berckmans, in Augusta, Georgia, some years ago had a diameter of seven feet, three feet above the ground, but this was of exceptional size. The stout trunk rarely exceeds three or four feet through, and the tree

reaches a height of sixty or seventy feet. The head is round-topped and shapely; the ample leaves are yellowish green as they unfold, and at maturity they are a dark bluish green above and pale pubescent below, turning in autumn to bright yellow and falling early. The flowers are insignificant and borne in unisexual catkin-like clusters, and the fruit, as is well known, resembles a small blackberry and ripens here early in July. Not much attention has been given to selecting trees for the purpose of securing fruit in greater abundance or of better quality, but even in its natural state the fruit is by no means to be despised. We invite attention to this Mulberry now, however, as one of our most desirable native ornamental trees. It is hardy, and when it is placed in rich soil grows rapidly and gives a dense shade. This week our attention has been called to several of these trees which are growing in the churchyards and private grounds of New York and Jersey City. Some of these specimens are forty or fifty feet high, and the dark green foliage of their broad and compact crowns gives them a beauty which few other trees possess. They deserve to be used much more freely in our parks and private grounds, and, indeed, wherever trees of the second size are required.

RENANTHERA STORIEL.—On page 284 of the current volume, Mr. Watson describes a plant of this beautiful Orchid in flower, which was shown by Sir Trevor Lawrence at an exhibition of the Royal Horticultural Society in London. The spike in this instance was eighteen inches long, and carried fifty flowers each two and a half inches across. Hitherto the plants in cultivation have not flowered regularly, but the possessor of one of them will feel rewarded for his years of care if even at irregular intervals it produces a spike as large and perfect as the one which has been sent to this office by Mr. A. Herrington, from the gardens of H. McK. Twombly, Esq., in Madison, New Jersey. Unfortunately, the photograph is not sufficiently distinct for the best reproduction. We may say, however, that these flowers appeared here at the same time as those on the plant of Sir Trevor Lawrence. The plant which flowered in New Jersey has been in the collection there for several years without showing any disposition to bloom. Mr. Herrington writes that it had become lanky and consisted of one stem four and a half feet in height, devoid of leaves on the lower half, but well furnished with aerial roots. As an experiment, early this year it was beheaded eighteen inches above the top of the pot and the severed portion was repotted. Doubtless this drastic treatment had some influence in inducing the formation of a flower-spike, as one was observed within three months after the decapitation, and this ultimately developed into a magnificent specimen of its kind. It bore in all seventy-three flowers, every one opening to perfection. The perfecting of this number of flowers proved a considerable strain upon the plant in its semi-established condition, causing it to shrivel perceptibly, so the spike was cut, and it kept fresh in water a number of days. In the whole Orchid tribe there are few so richly and highly colored as this *Renanthera*, its flowers being uniformly of a bright crimson, varied with transverse bands of a deep dark crimson, velvet-like in richness and texture. The disposition of the flower-spike and its habit of branching are noticeable for almost geometric regularity. The main branch of the flower-raceme grew out at right angles with the stem of the plant, and throughout its entire length of nearly two feet maintained an even horizontal position. Its four lateral branches, two on either side, grew at right angles with the main branch, keeping the same regular rigid poise. The decapitation of the plant, while evidently hastening the production of flowers, proved a double gain in giving another plant, and a latent bud has since started into growth toward the tip of the old leafless stem which was left in the pot in which the plant originally grew.

THE DOUBLE GOLDEN RUDBECKIA.—This is the garden name of one of the latest additions to the list of our attrac-

tive hardy perennials. Mr. Gerard reports that a second season's test proves it to be a plant likely to become generally popular, though we are supplied with almost a surplus of yellow flowers in midsummer and later, among which the single *Rudbeckias*, or Black-eyed Susans, have always been favorites. The plant introduced as the double *Rudbeckia* has a distinct habit, being tall, growing three to four feet, with unbranching stems and pinnate or palmately parted smooth leaves. The six or more flowers which are borne from each stem on long peduncles are nearly three inches in diameter and pretty double, showing no centre, in color a golden-yellow, but not quite a perfectly satisfactory clear shade. They may be rated with the double Sunflowers, Zinnias, etc., useful for bold effects in the garden or decoration. The plant is probably a sport or variety of *R. laciniata*. Mr. Gerard suggests that the flowers resemble in form those of a Cactus Dahlia, but their somewhat muddy color is against them.

Cultural Department.

Fall and Winter Care of the Vegetable Garden.

THERE is one particular in which many gardens, even those in which their owners take great pride, are sadly neglected, and that is in their treatment during the fall and winter months. After a crop is gathered no further attention is given the soil until it is wanted the next spring, and many a garden, which, during the spring and early summer, is well cared for, neat and attractive, is a waste of bare ground or of rank weeds and scattering vegetables for the remainder of the year, making it anything but attractive. There is not only no need of this, but it lessens very materially the productive capacity of the garden. The farmer finds it absolutely necessary to occasionally seed down his fields. Why? So that the soil may be lightened, loosened and filled with fine roots, giving it what Professor Bailey aptly calls "fibre," but many of our gardens have been in cultivation for years, utterly regardless of conserving this quality which the farmer finds so necessary, and in consequence we are forced, in order to get a crop, to use an excessive quantity of manure, to the detriment of the quality of our vegetables. This deterioration of the soil can be prevented and our gardens be made attractive, or at least not repulsive, through the whole year by the use of soiling crops. As soon as a crop of Lettuce, Radish, Peas, Beans or Corn is past, let the ground be immediately cleaned, cultivated, and sown with Crimson Clover, Rape, Peas, Rye, Turnip or some other crop. It may be that from the want of moisture the seed will not start immediately, but if not the spot will not look untidy, and after the first rain the plants will soon cover the ground, shading it from the injurious heating by the sun, filling the soil with roots, catching and holding fertility which otherwise would be lost, and, by no means least, making a spot which would otherwise be unattractive, beautiful. We know of one case where the growing Clover was so beautiful that the owner could not bear to spade it under and sacrificed one season's crop of vegetables to its beauty. We think there is no way in which manure can be made so available for the next season's crop as by applying it to such a soiling crop in the fall or early spring. If there is much trouble from insects we can do much to rid ourselves of them by spading or plowing the crop under, the day before the final freeze-up in the fall, thus breaking up their winter quarters and exposing them to frost and ice; but we think the greatest benefit to the soil would result from leaving the crop until a few days before the ground is wanted in the spring.

Detroit, Mich.

Will. W. Tracy.

Small Fruits.

DURING the month of September preparations should commence for another season, and upon the treatment now given the supply of fruit will largely depend. The old canes of Blackberries and Raspberries should be cut away and a requisite number of the strongest of the young ones tied to the wires or stakes, the weaker ones being removed to concentrate the vigor of the plants and allow freedom of light and air to those that are left.

If left untied the young canes are sure to be more or less broken or injured by storms. Frequent hoeings will be required to keep down weeds, and all suckers should be dug up as they make their appearance, unless the making of a fresh

plantation is contemplated, when the strongest may be left until the leaves have fallen, after which they can be lifted and planted closely together in what is commonly called a nursery-bed, where they can be conveniently protected. The planting in their permanent quarters had better be delayed until spring. We find that fall planting usually results in a good many losses.

Some approve of cutting or pinching back the young canes while in a green state, but our experience is that more harm than good results from this practice, as it has a tendency to excite the buds into growth, which ought to be kept dormant until spring. We have seen the heading back done after the leaves have fallen in November, but nothing is gained, unless it is necessary for saving time in spring. We find that the points of the canes are usually cut back more or less by frosts during winter; and it is advisable to leave the heading-back process until the severest of the weather is over, but it should always be done before the sap has begun to flow. In this section it is unnecessary to cover the canes during winter, but a good mulching with stable litter will be found beneficial. This is better applied after the ground is frozen over just hard enough to bear a man's weight.

The principal work in the old Strawberry-beds at this season is keeping them well hoed and clear of weeds and removing all runners as they appear. Fresh plantations may still be made, though if this has been done in August so much the better, as they then have the advantage of a good start before the winter comes on.

It is most important, especially in late plantings, to have the ground well firmed along the lines where the plants are to be set out. We take it for granted that the ground has been well tilled, and is, therefore, loose, and unless it is well firmed around them and the plants set well down they would be left too high after the soil has settled, and therefore subject to be thrown out by frost; not only this, but the Strawberry-plant always inclines to rise, and the further it is kept down at first the better, so long as the crowns can be kept clear. Much has been said about the expediency or otherwise of mulching Strawberries and of the different materials to be used. They are undoubtedly benefited by a mulching, and we have found nothing better for the purpose than good long stable litter. The covering over the plants themselves should be very light, but heavier between the rows, the object not being so much to protect the plants themselves, but to prevent alternate freezing and thawing of the ground. It should be applied as recommended for the Raspberries after the ground has frozen over.

Tarrytown, N. Y.

William Scott.

Late-flowering Shrubs.

OWING to the frequent rains since midsummer the late-flowering shrubs are in finer condition here than they have been for several years past. They made good growth in the early part of the season, and the continued supply of moisture has enabled them to develop their flowers so that now there is quite a profusion of bloom in the shrubberies where, in ordinary seasons, there is little else to be seen than parched foliage. The large-flowered *Hydrangea paniculata* is usually a sorrowful object with us unless watered several times a week during dry spells. Some of the plants which were put out here, about the time of their original introduction from Japan, have grown to a height of about fifteen feet; a few of them have stems three or four feet high and several inches in diameter.

Under the name of *Vitex Agnus-castus* there are several distinct species cultivated, none of them approaching the true species in value as a late-blooming shrub. There are at least three varieties differing only from each other in the color of the flowers, which are purple, pink or white. Cuttings of them root freely from now on under glass, or they can be raised from seed which ripens in abundance. The *Crape Myrtle*, *Lagerstrœmia indica*, from the fact of its being unrelatively hardy in the northern states, is comparatively little known north of here. A great deal may be accomplished with it, however, by giving it a little protection in the winter months. Old plants which have been thoroughly established in favorable seasons take no harm here when the thermometer is below zero, but one and two year old plants get killed to the ground when the mercury falls so low. But even when killed to the ground year after year, they make rapid growth the ensuing summer and flower after attaining a height of about three feet. The flowers are bright pink, and there are forms with purple and pure white flowers. Old plants set seed abundantly, and if sown early will flower the following summer.

Lespedeza Sieboldii, often called *Desmodium penduliflo-*

rum, is a true herbaceous plant, although sometimes classed with shrubs; it gets to be about six feet high and forms a symmetrical plant. This, the only species of the genus grown extensively on account of its extremely ornamental character, is now coming into bloom and will continue till frost. It is a very reliable plant, especially for soils which get dust-dry in summer. There are two forms, rose and white flowered; it is propagated by division early in the season, or from cuttings taken any time after the wood is ripe.

For our climate, both north and south, few shrubs behave better than the old-fashioned *Hibiscus Syriacus*, but for some reason we seldom see in common cultivation any but the varieties which the old books tell us were in existence a hundred years ago. During the months of August and September these plants produce their large flowers in great profusion. Some of the best kinds are the following: *Leopoldii*, bluish color shaded with rose, very double on young vigorous plants, the flowers borne on the ends of the long shoots making it a valuable plant for cutting; *Totus-albus*, the best single white, one of the most floriferous—it comes true from seed, which even the small plants ripen freely; *Comte de Cainaut*, very double, bluish; *Camelliaeflora*, white, slightly tinged with pink, very dark centre; *Rubra plena*, the best of the double reds.

Some seasons *Clerodendron viscosum* is a mass of bloom here; during others it shows only scattered flowers. Where it is hardy it is a good plant for dry soils, as it roots very deeply. In the southern states it increases so fast from underground growths that it has become a nuisance. It is not reliably hardy north of Washington.

Abelia floribunda commences to bloom on the current season's wood early in summer and continues in flower later than any other shrub; last season we picked some flowers from it a few weeks before Christmas. In mild winters it is ever-green, like some of the *Ligustrums*, but during severe seasons the leaves fall off. The plants, however, are not injured in the least; some immense specimens have stood in exposed places here for the past forty years. It is a native of Mexico and is propagated by cuttings made from the ends of the growing shoots in the fall.

Caryopteris mastacanthus is a member of the *Verbena* family, which has been called a blue *Spiræa*. It is just as valuable as if it were a *Spiræa*, and probably more so, because it flowers when its flowers are most wanted. It is said to grow only two feet high, but on some plants which did not get killed to the ground last winter the growths are four feet long and covered with buds. It is said to be quite hardy in Massachusetts; if so, it should be in every collection, as it deserves all the good things that have been said of it.

Botanic Garden, Washington, D. C.

G. W. Oliver.

An Autumn Garden.

OUR borders are for the most part filled with plants which bloom from spring until the end of July, and to be perpetuated in good health the plants must remain and ripen their growth. The deserted look of the borders toward the end of summer and in autumn is but poorly relieved by sparsely planted clumps of *Phloxes*, *Asters*, *Sunflowers*, *Lilium tigrinum*, *Hemerocallis Thunbergi*, *Campanula ranunculoides* and a limited number of plants which can be considered reliably hardy. By mid-autumn they are scanty indeed. It must be so, however, if the borders are planned for spring flowers alone, and it is scarcely satisfactory to say there is always "something" in bloom.

It has often occurred to me that we might have an autumn border—an autumn garden—if we wished, wherein all plants which are at their best at this season could be grouped together. There is plenty of variety to choose from. We might include some shrubs with bright-tinted foliage or handsome fruits, but it should be remembered that shrubs and herbaceous plants do not grow well together. The herbaceous border should not form part of the garden scene, but be situated rather out of the way, where the plants have a chance to grow in good air and sunshine, to be seen at close range only. In small suburban gardens the case is different, where no broad effect is possible. While the autumn garden would not be at its best until late summer, it never would look untidy.

Autumn-flowering hardy border plants are mainly Composites, and the prevailing colors are shades of purple, as in the *Asters*, or yellow, as in the *Sunflowers*. For color-effect some annuals might be included, as *Zinnias*, *Scabious*, *Verbenas*, especially *V. venosa* and *V. erinoides*, *Pentstemons*, *Antirrhinums*, *Nicotiana affinis*, single *Petunias*, new *Early Cosmos* and *Bleeding Heart*, *Amaranthus caudatus*. Many beautiful tender perennials will be found serviceable in this

grouping. Dahlias, Cannas, *Salviasplendens*, *Leonotis Leonurus*, the Lion's Tail plant, with bold spikes of orange-scarlet flowers, and the lavender-flowered *Caryopteris mastacanthus*. Tender bulbous plants also might be included, such as *Tritomas*, *Gladiolus* and *Montbretias*. *Anemone Japonica*, which is locally hardy, but better treated as a tender plant, will be a valuable addition. Among reliably hardy plants, in addition to those already noted, are *Pyrethrum uliginosum*, with its large, handsome Daisy-like flowers, splendid for cutting; *Aster Novæ-Angliæ*, *A. longifolius formosus* and *A. Shortii*; *Plumbago Larpentæ*, *Rudbeckia purpurea*, *R. Newmanni*, *Lilium lancifolium*, *Lobelia cardinalis*, *Vernonia Noveboracensis*, *Eupatorium purpureum*, *Chelone Lyoni*, *C. barbatus Torreyi*, *Funkia subcordata*, *Asclepias tuberosa* and the best of the Golden-rods. *Clematis paniculata* and *C. Pieroti* are very ornamental when trained upon lopped cedar posts. Ornamental Grasses are also effective, and this list might be considerably extended.

Wellesley, Mass.

T. D. Hatfield.

Some Good Autumn-flowering Plants.

A RECENT editorial in GARDEN AND FOREST called attention to what is only too well known to busy amateur gardeners—namely, the absence of long twilights in our country. It is especially at this season that rapidly shortening days forbid much garden work by a business man, and as the early morning finds all vegetation dripping from heavy dews it is small wonder that such aggressive enemies as Couch Grass, etc., make a strong effort for the possession of the soil. Fortunately, most of the plants of the season are also strong, as *Phloxes*, *Sunflowers*, *Asters*, *Rudbeckias* and the like, and capable of a vigorous dispute for the occupation of the ground, and these showy plants are apt to be most in evidence now in every garden. But there are other plants and flowers more interesting than these at this time, if less abundant and showy. Among the great family of large-flowering *Amaryllids* I do not recall any more beautiful in bloom than *Crinum Moorei* and its hybrid *C. Powellii*. *C. Moorei* is a Natal species with an ovoid bulb and a long neck, with spreading leaves two feet or more long. An umbel of six to ten flowers is supported by a thick, tall peduncle, and these are individually of large size, slightly hooded and drooping, and usually of the purest and most charming pink. They vary somewhat in color, there being forms with white flowers. This is an indispensable plant if one has cool-greenhouse facilities. The culture is of the simplest; it requires potting, and is apparently not fastidious as to soil. It is well to grow it along into a fair-sized tub with its offsets, of which it is prolific, until it makes a good specimen, as it will then be more effective in the garden when in flower. In the late fall it should be removed to a cool house and kept fairly dry till new leaves appear in midwinter, when it may have more moisture, the supply being increased on removal out-of-doors in the spring. *C. Powellii*, while resembling *C. Moorei* in flower, has a bulb with a shorter neck and drooping channeled leaves some four feet long. It is especially valuable for its hardiness. In a sheltered place here it is cut to the ground, but reappears in the spring, being only protected with a small mound of ashes or earth to throw off moisture.

Another charming flower is *Acidanthera bicolor*, which Mr. Endicott described, with a figure, in the first volume of GARDEN AND FOREST, page 484. This Irid has *Gladiolus*-like corms and leaves and numerous sweet-scented flowers on pendulous stems; they are white, with chocolate markings.

Some years ago I received from Monsieur Lemoine a collection of hybrid *Montbretias*, *Aurea*, *Etoile de Feu*, *Phare*, *Bouquet Parfait* and others. The labels were long since lost and the varieties grown together, for the first two named represented fairly well the whole collection. *Etoile de Feu* is especially fiery, and when well grown a most satisfactory variety. The plants seem to require high culture in good soil and much moisture, otherwise the leaves are apt to turn brown on the edges and the corms devote themselves to increase instead of flowers. My success with *Montbretias* has been rather varied, and I think others have had similar experience. It has been recommended to grow them in partial shade, though their leaves seem to indicate that they should be fully exposed. Perhaps the shading, if partial, may have conserved the moisture at the roots. Of course, *Gladioli* are plentiful now, though the rage for dwarf *Cannas* has affected their favor in many gardens. Personally I prefer the somewhat quaint and irregular forms of some of the *Gladiolus* species to the perfect hybrids of the florist, which are so proper and exact as to affect one as unpleasantly as some human beings with the same qualities. There is quite a list of flowers which I much enjoy in my friends' gardens. Some admirable *Gladi-*

olus are *G. sulphureus*, *Leichtlini cruentus*, *aurantiacus*, *Eckloni*, *Byzantium* and the hybrid *G. Colvillei albus* (The Bride). There seems to be a perennial discussion in horticultural circles as to the hardiness of *Gladioli*. After an experience with some fifty species I do not believe that, with the possible exception of *G. Segetum* and its near allies, any of the species are hardy in this latitude under ordinary treatment, and these only when the summer proves dry and the garden is well drained. They all evidently have a resting period of perfect dryness in a state of nature, and annual lifting is the only safe treatment with either the early or late flowering species. I have known odd bulbs to linger in the garden for several years, but they decrease in vitality and seldom even flower.

Elizabeth, N. J.

J. N. Gerard.

The Forest.

The Burma Teak Forests.—VII.

RATE OF GROWTH AND ANNUAL YIELD.

TEAK, like other trees, grows rapidly in some, slowly in other localities. The researches which were made regarding rate of growth in the thirteen districts, for which, up to date, special working plans have been prepared, have led to the conclusion that on the hills Teak-trees grown up under the regime of the annual jungle fires attain four feet six inches in girth at an age between 100 and 115 years, while trees six feet in girth are between 134 and 156 years old. Hence the time which a second-class tree requires to attain first-class size may, under these circumstances, be accepted on an average at thirty-eight years. This, we have seen, is the period over which it is intended, under the working plans lately prepared, that the girdling of the present stock of first-class trees shall be spread. It has previously been mentioned that the districts here described comprise a few small blocks situated in the plains. Here the rate of growth is more rapid, but their area is small, and they may be neglected upon the present occasion.

As explained repeatedly, the annual yield of these forests has on three occasions been fixed—in 1856, 1868, and by means of the special working plans prepared between 1884 and 1892. In all cases was the yield based upon the estimated quantity of the growing stock of Teak of the different classes, and upon the rate of growth assumed at that time. The following figures give the annual yield fixed on these three occasions for the eleven forest districts in the Irrawaddy valley and the time supposed to be required on an average for a second-class tree to attain first-class size:

The working plan of 1856 assumed 24 years and fixed the annual yield at	9,000 trees.
The working plan of 1868 assumed 72 years and fixed the annual yield at	5,800 "
The special plans, 1884 to 1892, assumed 38 years and fixed the annual yield at	11,230 "

Those who have to break fresh ground in the matter of regular forest management will understand the satisfaction which the writer of these lines feels, that in 1856, when the data then at his disposal led him to credit the Teak-tree with a rate of growth much too rapid, he yet fixed the annual yield below what the forests are capable of yielding. Regarding the number of trees actually girdled in these districts during the twelve years from 1856 to 1868, in accordance with the working plan of 1856, there is some doubt. The returns give 153,856 trees, or 12,821 a year. In these districts girdling operations were conducted in 1857 and 1858, when no competent officers were available for supervision, and there is ground for believing that a much smaller number than that reported were at that time actually girdled.

It must be distinctly understood that under the working plans lately prepared the number of trees actually girdled will, to some extent, also be regulated by area—that is, by the localization of girdling operations. The yield sanctioned by the plan for a particular district is a maximum, which must in no case be exceeded, and which must not be worked up to, if in the area assigned to a particular period the full number of trees that under the rules laid down for their selection may be girdled, cannot be found on that area. Thus, for the Thonzay forest district the plan of girdling has been laid down for a period of thirty years, divided into six sub-periods of five years each. To each sub-period have been assigned a number of compartments, in which during the five years fixed a maximum of 5,000 trees may be girdled. Thus, out of the 114 compartments nineteen have been assigned to the first sub-period (1885-9), while eleven compartments were assigned to the last sub-period (1910-14). In the compartments assigned

to the first sub-period the older trees prevail, while the younger trees are more numerous in the areas assigned to the last sub-period.

SELECTION OF TREES TO BE GIRDLED.

The rules for the selection of the trees to be girdled are similar to those which were laid down at the outset in 1856, but with some important points of difference. In 1856 there was no staff of officers available for the care of these forests, hence the selection of the trees to be girdled had to be regulated by a few broad general rules. The work had necessarily to be commenced on a large scale in an exceedingly rough manner. Gradually, as officers were appointed for the management of the different forest districts, the work was organized on a more systematic plan, hence in 1880, when I laid down the principles to be observed in the selection of the trees to be girdled within the demarcated reserves—that is, within the tracts intended to be permanently maintained as forest—the main point insisted upon was that each locality must be treated on its merits, and that by the removal of the trees girdled the reproduction of the Teak must not be impeded, but, if possible, be promoted. This principle necessitated a different treatment of patches where Teak prevails from those where it only forms a small proportion of the growing stock. Again, woods in which mature trees, those of the first class, prevail, would require a treatment different from those in which the smaller classes are more numerous. In the special working plans an important rule has been introduced which is in accordance with this principle. A distinction is made between Teak growing in moist forest, where the trees remain green until the end of February, and where consequently the rate of growth is somewhat more rapid than in dry forest, where the trees lose their leaves earlier in the season. And it has been provided, that while in dry forests the minimum size of the trees to be girdled remains six feet as heretofore, in moist forests no tree should be girdled that had not attained a girth of seven feet. These two classes of Teak-producing forest can most conveniently be distinguished by the species of Bamboos associated with the Teak-tree, *Bambusa polymorpha* being the species most common in the moist, while *Dendrocalamus strictus* prevails in the dry forest. It is obvious that under these special working plans the girdling operations are regulated with greater regard to the maintenance and improvement of the forests than was possible under the summary plans which at the outset were a necessity. In each district a number of compartments are assigned to one sub-period of five or six years, the maximum number that may be girdled in those compartments during that sub-period is fixed, and the selection of the trees to be girdled is governed by the peculiar conditions of each locality. Under these arrangements it was not necessary to maintain the original rule, that in one locality never more than one in four of the mature Teak-trees should be girdled. As an experiment this rule had already been set aside in 1868, and this was justified, because the annual yield of the forests at that time was fixed at a very low figure.

Boon, Germany.

Dietrich Brandis.

Exhibitions.

The Boston Flower Show.—II.

LAST week we had a general note on this admirable exhibition, with the names of some of the leading prize-takers. Large specimen plants were not abundant, but, in accordance with the tendency here and in Europe, there were many medium sized plants and groups which, to a certain extent, fill their places, although one likes to see specimens of *Clerodendron*, *Allamanda*, *Stephanotis* and the like which have been grown with great care for years until they have attained stately proportions. Specimen flowering plants were few as compared with those whose value consists in form and foliage. The new *Allamanda Williamsi*, however, was well shown, and the fine specimen sent by N. T. Kidder, Esq., added much to the appearance of his group of plants. It is a very floriferous and graceful plant, and although the flowers are smaller than on some of the old varieties, they have the same rich golden color. It is easily propagated and will soon be in every collection. The *Dipladenias* shown by Mr. George McWilliams, especially two plants of *D. amabilis*, grown in large pans and trained to a globe frame, attracted special attention. They were elevated at the end of the hall and conspicuous under the electric lights, and well deserved the silver medal they received. These plants are among our best stove climbers, and the flowers are unexcelled in brilliancy of color. The specimens exhibited were grown in a compost of roughly broken peat and sharp silver sand, so that there was no danger of their ever becoming

water-logged. Mr. McWilliams' *Caladiums*, especially plants of *C. argyrites* and a comparative novelty named *C. minus* *erubescens*, were especially noteworthy. In the magnificent group of stove and greenhouse plants from the Harvard Botanical Gardens, the best plants were one of *Encephalartos horridus* and *Maranta* (*Calathea*) *Vanden Heckei*, and a good example of the Boston strain of *Nephrolepis exaltata*. For a splendid specimen of the last-named Fern, six feet through, Mr. F. W. Fletcher received a certificate. In Mr. J. C. Bailey's collection a handsome plant of *Maranta rosea lineata*, which is considered difficult to grow, was good enough to receive a silver medal, while a *Spherogyne latifolia*, with panicles of lovely pink flowers, and a specimen of *Cyanophyllum magnificum* both attracted much attention. This last is one of the finest of stove evergreens, which, at its best, has leaves two and a half feet long, with a velvety midrib and ivory-white primary veins, reddish purple beneath. A striking specimen, *Heliconia aureo-striata*, was shown by John L. Gardener, Esq. (William Fletcher, gardener), and the Madagascar Lace Plant, always interesting, was shown by Mr. E. L. Converse, although, unfortunately, it was in a dark corner of the hall.

Every year it seems that aquatic plants have reached the summit of excellence, but every year there are novelties displayed which prove in some way better than the old sorts. These plants, favored by the heat of the past summer, never were seen in such abundance or in such good form at an exhibition in this country. In Mr. L. W. Goodell's collection there was a flower of *Nymphæa rubra* which left nothing to be desired in form or color. Of course, Mr. Brydon sent up from the Yarmouthport gardens of Mr. Simpkins an admirable collection which contained some of the newest and costliest of Mr. Marliac's creations. *Nymphæa Robinsoniana* is a remarkable flower of a deep orange-red, with a splashing of carmine, which makes it quite distinct from all others. These flowers are particularly striking when floating on the surface of the water in the sunshine. *N. ignea* is another superb Water-lily of a reddish purple, but so brilliant as to be almost dazzling in the sunshine. This plant does not seem to have a strong constitution, and, while it must be popular, it will probably be scarce and costly for some time.—[Mr. Marliac's hybrid, called *Ignæa*, seems to flourish very well in England. Flowers which were open late in June in the water gardens of Gravetye Manor, the estate of William Robinson, Esq., were easily the brightest of all the *Nymphæas* then in bloom.—ED.] *N. lilacina* has a beautiful flower of a lilac tint and the peculiar fragrance of a Tea Rose. There were also remarkably good examples of *N. Devoniensis*, *N. rubra*, and particularly of *N. pulcherrima*, which showed a fine large flower of a beautiful soft blue. Of the *Nelumbiums* there were two vases of *N. gracilis* with white petals with golden stamens, and carried on long stout stalks, which last well when cut. These flowers are delightfully fragrant, the odor resembling that of Lily-of-the-valley. One of the new French hybrids was *Nymphæa fulgens*, shown by Oakes Ames, Esq. (Carl Blomberg, gardener), with flowers somewhat resembling *N. ignea* in color. In this collection were also flowers of several varieties heretofore mentioned, as well as of the varieties, *Exquisita* and *Caroliniana*, of our native *N. odorata*. The display which William Tricker brought from the gardens of Henry A. Dreer, the Philadelphia seedsman, showed thirty-five varieties of *Nymphæa* and *Nelumbium* and a flower of *Victoria regia*. The new *Nymphæa O'Marana* was well shown, and so was *N. Deaniana* and *N. Kewensis*, the last of which has been especially good, owing, undoubtedly, to the warm summer. This was true of all the tropical *Nymphæas* in the collection, but, although the hardy varieties were well represented, they showed the effect of the lateness of the season more than those from collections three or four hundred miles to the north. *Nelumbium striatum* showed extremely well, combining a robustness and free-flowering quality. *N. Kermesiana* is another handsome and strong-growing plant with a pink flower. All these flowers were grown in the open water, which again demonstrates their usefulness and the adaptability of both the hardy and the tropical varieties for all purposes in gardens large or small, public or private. The fact that the flowers in Mr. Dreer's collection had been cut for thirty-six hours and shipped from Philadelphia, and after this made a creditable display, is sufficient evidence of their value for cutting.

Notes.

Owing, perhaps, to the abundance of rain this summer, *Clematis paniculata* is flowering very freely near this city. For some reason its flowers expanded a week later than usual, but now many plants are completely covered with them. We

know one specimen that covers a trellis more than twelve feet square, in which the flowers completely hide the foliage, and it makes a picture that arrests the attention of all who pass it.

How to thin out the apples from overloaded trees so as to leave only enough fruit to attain its best development is a difficult problem. Mr. Charles A. Green, of Rochester, sets a man with an ordinary steel garden rake to pull the fruit from his trees, and when he has gone as high as he can reach he uses a stepladder for the upper branches. This seems like a rough-and-ready way of doing work which requires a good deal of judgment, and certainly none but a careful and intelligent man should be entrusted with it. If any one knows of a way to thin more quickly and judiciously we should be very glad to hear of it.

In response to our recent inquiry on this page as to the experience of persons who have grown the Japanese Wineberry, we have received a note from Mr. E. H. Burson, Superintendent of Green's Nursery Company, Rochester, who writes that the plant has been fruiting with them for about five years. It is hardy and prolific; the berries average as large as those of the Ohio, and those which have been sold command from ten to twelve cents a quart, which is the price of the best red raspberries. Mr. Burson calls it the handsomest raspberry on their grounds; it is of a bright color, and although a little tart, it is delicious, especially when used with sugar as other berries are.

Mr. J. G. Jack will conduct a series of lectures and field meetings at the Arnold Arboretum, beginning on September 19th and closing November 7th, for the purpose of supplying popular instruction about the trees and shrubs growing in New England. The class meets in the lecture-room of the Bussey Institute for the review of certain groups of trees and shrubs, and will then make an informal outdoor study of the plants. The purpose of the course is to indicate by comparison the easiest means of distinguishing common native trees and shrubs and to recognize foreign species which have been introduced into gardens. An hour and a half to two hours will be devoted to each meeting, which will be held on Saturdays at ten o'clock and Wednesdays at three. Applications or inquiries may be addressed to Mr. J. G. Jack, Jamaica Plain, Massachusetts.

The Japanese Knotweed, *Polygonum cuspidatum*, becomes an aggressive weed at times. It is too obtrusive, for example, in Central Park, but where it can be kept within bounds in a damp place it makes a striking clump of foliage six feet high, and during August and September it is covered with its beautiful sprays of white flowers. Its relative, *P. Sachalinense*, about the value of which as a forage plant so much discussion has lately taken place, is now recommended for planting in the Sahara on the borders of the small areas where vegetation already flourishes. These areas are said to be much more numerous than it was once thought they were, and this Knotweed is commended as able to endure the drought and as a good plant to bind the sand. Our experience with the plant is that it likes to get at water in the subsoil, and we should fear that it would not flourish in a desert.

Professor Halsted, of New Brunswick, writes to *The American Florist* that he has observed a spot on the leaves of *Nymphæas* for some time, but not until this year has he received specimens of affected leaves as an evidence that the disease was causing some alarm. This spot is caused by a species of *Cercospora*, but one which is not yet recorded. As shown in an engraving the spots are small, circular and numerous, the affected portions soon becoming sunken and bearing multitudes of spores on the upper side. These germinate rapidly, and as it is not improbable that the spores get into the water and in this way are distributed to all parts of the pond, the infection spreads quickly. Experiments will be made with fungicides upon this new pest, but it is plain that the conditions are so unlike those of terrestrial plants that it is not safe to predict results. Professor Halsted asks for specimens of diseased leaves in order that he may make further studies of the blight.

Mr. Joseph Meehan advises those who wish to plant trees and shrubs this year not to wait until the leaves fall, but as soon as the wood is well ripened to strip off the leaves and then to plant the trees. The soil at this season is warm, often warmer than the air, and this condition encourages the immediate throwing out of fibrous roots. Mr. Meehan writes to *The Rural New Yorker* that if the leaves are left on a few twigs of the tree they will drop off in a few days, and this will guarantee the success of the work. If they do not drop, but wither

on the stem, this is a sign that the tree has not thrown out roots and that it will not probably live. The tree should be set in the hole, the earth filled in, and if the soil is rather dry it will make little difference, because in this condition it can be rammed tightly around the roots until the hole is three-fourths full. Then water should be poured into the hole and the remaining soil thrown in later without much ramming. What a tree needs to assist in forming new roots is a warm moist soil.

Among pears now arriving from California are Beurre Hardy, Beurre Clairgeau, Beurre d'Anjou, the highly flavored White Doyenne, the brownish red Louise Bonne of Jersey, Duchesse d'Angouleme, Bartlett, Seckel, the very large Souvenir du Congrès, the roundish pyriform Howell, the juicy white flesh having a vinous flavor, and Onondaga, or Swan's Orange, originated in Connecticut. Of these, Bartletts are the most popular, and sell at retail from twenty-five to seventy-five cents a dozen, the latter price buying extremely large and firm specimens. Some of the Seckel pears from California are unusually large and beautifully colored, and retail for the highest prices. Seckel pears from New York state cost seventy-five cents for a ten-pound basket. Salway and Piquet's Late peaches are now coming from California. Some fine examples of the well-known Stump the World are being received from the highlands in Maryland; also of Morris White, a favorite variety for preserving with brandy, and Smock Freestone, valued for preserving on account of its moderately juicy flesh. Of a dozen kinds of plums from the Pacific coast now offered here, Kelsey's Japan is the handsomest and the richest in flavor. This fruit has steadily gained in popular favor since its introduction in 1884. Some of these plums are a rich yellow and heart-shaped, while others are a deep red and apple-shaped. They are good keepers, and are at their best when thoroughly ripe and almost translucent. Many are extremely large, and the best command \$1.00 for a basket containing two dozen. Large Red Nectarines, beautifully colored and said to be the finest ever seen here, cost \$1.25 for a box containing two dozen. The choicest and showiest apples of this season are Alexander, Duchess of Oldenburg, Twenty-ounce Pippins and Maiden's Blush. Flame Tokay, Muscatel and Rose de Peru grapes are now at their best, and were included in forty-five car-loads of California fruits sold at auction in this city last week. Delaware, Niagara, Worden and Concord grapes, from this state, are now plentiful and cheap. New grape-fruit, from Jamaica, costs \$1.00 to \$1.50 a dozen.

A certain Rhode Island Greening Apple-tree in an orchard a mile north of Lake Erie last year produced ordinary fruit on the north-east side, while that on the south-west half were of mixed character, each apple being partly a Greening and partly a Talman Sweet. The two varieties appeared in sections for the most part corresponding to the carpels. In some examples three sections, or three-fifths of the apple, were Greening and two-fifths Talman Sweet, while in others the proportions were reversed. In others one-fifth was Greening, and in others still the proportion of Talman Sweet was smaller yet. The different parts were in most cases easily distinguished by the color and by the greater protuberance of the Greening as forming a part of a larger apple, and the flavor of the different parts was as distinctly those of different apples as if they had grown on separate trees. The line of separation, though not very definite, in most cases corresponded with the divisions between the carpels and ran to the summit of the apple, except that a small part around the summit seemed in every case to be Greening. A short distance to the south-west of this tree stands a Talman Sweet tree, so that it is probable that this phenomenon is due to cross-fertilization between the pollen of the Talman Sweet and the ovule of the Greening. This account was written for a late number of *Science* by Mr. T. H. Lennox, of Woodstock, Vermont, and Professor L. H. Bailey, who had the privilege of examining samples of the apples, testifies that they seem to give incontrovertible evidence of the immediate effect of cross-fertilization. Of course, some interesting questions arise, and Mr. Lennox wonders why the pollen, which acts directly upon the ovule, should so profoundly affect the receptacle and calyx which make up the fleshy part of the apple. Equally difficult, too, is it to understand why cross-fertilization, which one would think must frequently occur in Apple-trees, should in this instance produce mixed fruits, while in a thousand cases it has no appreciable effect whatever. Professor Bailey adds that he had never before been convinced that such immediate effect in flavor and other varietal characteristics could occur, but he is now satisfied that this is possible, although it is certainly rare, and therefore exceptional.

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A River Parkway.

TWO years ago we discussed in these columns (see vol. vii., pp. 191 and 231) certain projected improvements in the lower reaches of the Charles River, lying within the limits of Greater Boston, and recommended by a joint committee consisting of the Metropolitan Park Commission and the State Board of Health. This work has been already begun, although an insufficient appropriation has prevented the complete realization of the admirable plan, and the beauty of the banks, not to speak of the comfort of the people who live near them, in one conspicuous instance at least, has been marred by the erection of a manufacturing establishment on ground which the city ought to have possessed. This first report related to that portion of the river which is mainly a tidal estuary, while a second and most interesting one, just issued, covers the course of the stream from the head of tide-water for sixteen miles through the metropolitan district between Dedham and Watertown.

In their review of the situation the landscape-architects of the Commission, Messrs. Olmsted, Olmsted & Eliot, describe this as a typical example of the small rivers which have been forced out of their channel by the stony rubbish of the ice age and have found their way through its overflow surface as best they might, filling up one hollow and overflowing into the next. The scenery, which is pleasant without being very striking, consists of gravel bluffs and ridges, originally forested and many still clothed with wood, with gentler slopes which have long been cleared and cultivated, and occasional swamps between the stream and the higher lands, still filled with rushes and sedges. In the early years of the country the river was a commercial highway, and Watertown, at the head of the tide, was an important point; but under the act for encouraging manufactures the commonwealth gave as much of the common property in rivers and lakes of the state as was needed for water-power, so that there are eight dams now along the main stream about which villages cluster, and one of them has become a city. But the time has come when the growth of Boston and its suburbs demands a reconstruction of the condition of the river and a regulation of it to meet the needs of this new population, and as a matter of fact it is stated that in spite of the defacement of the banks and the inconveni-

ence occasioned by the dams, the river has once more come to be used as a highway, but a highway of pleasure instead of traffic. Now the inhabitants of this region stand more and more in need of means of recreation. Boating is one of the most agreeable of pastimes, and this river furnishes the most pleasant boating-course near Boston, and, therefore, the landscape-architects recommend that it shall be preserved as a parkway—that is, that the river and its scenery for these sixteen miles be made the central feature of a park, with its banks and waters available for public recreation.

If any such plan is adopted the first duty of its administration would be to keep the current clean from sewage and objectionable waste from factories which offends the eye and exhales noisome odors. The second duty would be to restrain dam owners from raising or lowering water-levels. This is not only because the lowering of the water leaves an exposure of muddy banks which displeases the eye, but the hot sun soon helps to decompose the rank vegetable matter, not to speak of animal matter which is sure to collect along the margins of this open sewer, so that the exhalations from these become a source of discomfort, and, what is still worse, deleterious to the public health. The third duty of the authorities in charge should be to provide public passageways over and around the dams for men and boats, and among many other recommendations it is incidentally suggested that electric launches might be rented to run as omnibus-boats or as cabs.

But simply to secure the navigation of a river is not to make it a water-parkway, unless the charm of the scenery is to be preserved and enhanced. Of course, it is impossible to banish manufacturing from streams in thickly settled communities, but, as the joint committee say, it is hardly reasonable that the centre of one of the most attractive portions of the metropolitan area should be forever given up to a use for which many less attractive spots are equally available. The destruction of the beauty of small rivers running through crowded neighborhoods seems almost inevitable, and it is impossible to preserve the natural charm of the banks without restricting important business and trade. The simple question, as the report puts it, is whether the preservation of the lovely landscapes of the Charles River will be worth to the community what it originally cost, together with the expense of supervising it.

It is clear that if the river-banks are owned by numerous private persons the scenery will ultimately be ruined. Granting that many of the river-side industries are to remain where they are, the landscape-architects suggest two ways of treating the remaining private property on the river. In the first place, as in parkways on land, a building limit along the bank may be made, with certain restrictions to prevent the felling of trees between the water and the building line without permission. This would provide rather a wide strip of land with private boat-houses and landings under special permit, and, although the general public would acquire no right to the land, a commission might preserve much of the local scenery without depriving the owners of country-seats of their privacy or the possession of a portion of the river-bank. A more thoroughgoing way would be to acquire for public use the actual fee of the private river-banks. Under this scheme the boundaries of the banks on either side ought to be streets which provide frontages for houses built to face the public domain. Spaces of varying width between the streets and the water could be made accessible by foot-paths, while the lands as well as the waters controlled by the governing commission would be continually policed. Such a possession of the river-bank would greatly increase the possible enjoyment of the people of the metropolitan district, for to follow on foot the meandering shore of a pretty stream is almost as delightful as to float with its current, and it is pleasant to have the privilege of landing anywhere from one's boat.

The report of the joint committee recommends the following steps as imperative:

(1) That the high-water surface of the Charles River from the dam at Watertown up to the Dedham line should be made a portion of the Metropolitan Park System; that measures should be taken to secure a water-level as nearly permanent as possible throughout the warmer months of the year; that arrangements should be made for the convenient transfer of boats over the dams. (2) That certain lands be taken upon the banks of the river for places of public resort and convenience, and that rights be taken in all the remaining frontage on the river for the purpose of preventing obnoxious uses of the same. (3) That the whole area so secured be placed under the control of some public authority having power to protect and improve it.

It will be seen that this report adopts a combination between the methods of restriction and complete ownership of the land. We have no space here to follow the convincing argument by which the joint committee justify their conclusions. Indeed, throughout this notice we have only given the outlines of a project which seems to transform a difficulty into an opportunity for providing a novel and valuable addition to the facilities of a great city for public recreation. There is an admirable map in connection with the report, with statistical tables of great value, and an interesting paper, by Dr. Thomas, on the problem of public health as affected by the stream. Altogether, the report is worthy of a place in the series of instructive public documents that have been published within late years in reference to the park work about Boston, and it is fruitful in suggestions which ought to be of use to all persons who are interested, officially or otherwise, in providing or maintaining public pleasure grounds for the people of our cities.

Trees in Visalia, California.

VISALIA, in Tulare County, is a very interesting town and district. The soil is of extreme fertility, watered by streams from the Sierras, and the growth of trees and plants is surpassed in no other part of California.

This beautiful region was a vast Oak forest when the pioneer herdsmen came with their cattle, and the ground for miles was covered with almost perennial pasturage, so well watered is this country of the Kaweah delta. Many of the great Oaks (mainly *Quercus lobata*) still remain. One of the finest of these, about eight miles from Visalia, is forty-eight feet in circumference close to the ground; thirty-four feet, measured five feet up, and 158 feet high. This is certainly a notable Oak, well worth going on record with some that *GARDEN AND FOREST* has hitherto listed. The park-like Oak groves are as stately as any in California, and some of them will probably long remain, as the land is more valuable in its present condition for dairying than if wholly cleared.

In the town of Visalia are some very choice specimens of single trees. The very largest and most striking Cedar of Lebanon known to me in California is in the grounds of Mr. R. E. Hyde. This noble tree is not less than seventy-five feet high, and the trunk girths about four and a half feet. It is loaded with cones and has borne seed for, I think, two seasons. Its age is probably twenty-five years from seed, having been planted twenty-three years here. The very rapid growth of this tree will hardly be understood by eastern readers, and is, indeed, difficult of belief, but the mild climate, rich soil, long growing season and abundant water are, of course, the determining factors. It stands in a bed of leaf-mold and decayed vegetable matter of unknown depth, brought down by the Sierra rivers into this great inland delta.

A very large Cork Oak formerly stood in the Visalia court-house yard. This was grown from acorns sent out by the Department of Agriculture some thirty years ago. The construction of a new building made it seem necessary to the authorities to cut down this noble exotic Oak, and so Visalia lost its most historic tree. Mr. Hyde's Cedar of Lebanon is now, it seems to me, the finest single

tree of any species planted in the San Joaquin valley since its occupation by Americans. The finest tree of Spanish planting is probably the great Porterville Fig-tree.

The orchards of the Visalia region are justly celebrated throughout California. Peach and Apricot trees yield profits the third year after planting. One gentleman told me that he picked from two Apricot-trees 1,684 pounds of salable fruit and also dried 800 pounds of fruit that was too ripe to ship, making a total of 2,484 pounds. A three-year-old Peach-tree yielded 324 pounds, and a Plum-tree of the same age bore eighty-seven pounds. I have seen orchards here in good bearing condition that averaged 600 pounds to each Peach-tree, and from 800 to 1,000 pounds to each Prune-tree. These are low estimates, as whole rows of trees bear more than this. *Prunus Simoni* comes to greater perfection here than in most other parts of California, and at present the demand for shipment can hardly be supplied. Even old California fruit-growers, however, know little about the Visalia district, as it is reached only by small branch railroads from the main line, and has only begun to come into notice during the past few years. It is expected that this town will be on the main line of the new Valley Railroad, and it will probably receive more attention in the future. It is certainly a very prosperous district, a vast green-islanded oasis in the midst of less improved territory.

Niles, Calif.

Charles H. Shinn.

The Sand Dunes of Northern Indiana and their Flora.—III.

TAKING the proper fruticose vegetation, we find *Cornus Baileyi* one of the first to appear upon a forming dune. It grows on when partly buried in the sand, forming new adventitious roots while lengthening its subaerial parts. It may be accompanied by the Red Osier, which is common beside the sloughs and in the damper hollows. The stems of these shrubs sometimes have a mottled look, or are strongly contrasted in color on opposite sides, the sharp sand driven against the windward side wearing off the bright-colored bark wholly or in spots, and exposing a polished surface of the green and freshly growing inner bark. In company with these will be found two Willows, *Salix adenophylla* and *S. glaucophylla*, the latter often more abundant than Bailey's Cornel. Both are similar to these Cornels in their mode of growth. The Gland-leaved Willow is the more venturesome of the two, early showing its gray tomentose leaves on some solitary stem or small cluster which has sprung up in sand quite free from other shrubs. *S. lucida* and *S. cordata* are not as common, but add to the variety of the more open dunes. The Prairie Willow, *S. humilis*, and the Dwarf Gray Willow, *S. tristis*, are not uncommon on the more sheltered dunes, where the scanty shade allows their ready growth. The Sand Cherry, *Prunus pumila*, ranks with the shrubs, early taking possession of the dunes. Two of the Grapevines, *Vitis cordifolia* and *V. æstivalis*, follow not long afterward. Finding little or no support, the stems lie upon the ground, their free extremities easily moved about by the wind, but serving well to protect the underlying sand by their ample foliage. With these we may place the Bearberry, *Arctostaphylos*, whose habitually prostrate stems serve a similar purpose. The running form of the Poison Ivy, with subterranean stems a little below the surface, and frequent branches rising a foot or two above it, grows in the same localities. When the large upright shrubs and trees appear, not only do the Grapevines become more frequent, but other climbing shrubs. The most common of these is *Celastrus scandens*, which festoons many spots with its bright green leaves. Another is *Smilax hispida*, whose prickly stems are occasionally seen. Both of these may also take the prostrate form, or manifest their climbing habit by arching or twisting stems. The Fragrant Sumach, *Rhus aromatica*, is well adapted to these exposed positions, and often has its straggling stems and branches partly covered by the sand heaped about

them. *R. copallina* is also common, and the Staghorn Sumach occasional.

The Sweet Viburnum, *V. Lentago*, does well in quite exposed positions, and grows to a goodly height when protected by the brow of a hill or a wind-break of trees. The Maple-leaved Viburnum and the round-leaved Cornel, *C. circinata*, are often encountered in the shelter of the woods, being shrubs of similar habits. With them grows the Witch Hazel, but less abundant. The Hop Tree, *Ptelea trifoliata*, and an arborescent Hackberry, *Celtis occidentalis*, var. *pumila*, grow near the shore of the lake. The Hackberry has straggling, subspinescent branches and ascending or spreading stems, which are sometimes fifteen feet or more in length. They form dense clumps with the aspect of a scraggy Thornbush, and a general appearance so unlike that of the common Hackberry as to be hardly recognized as the same species. In the fall they are sparsely provided with dark brown or purplish drupes, the thin sweet flesh orange-colored within. The common Juniper, though more abundant on the lower dunes, is equally at home upon the higher. Its prostrate stems and dense ascending branches, thickly covered with leaves, form one of the best protectors for the underlying sand when it has once become established.

Rosa blanda and *R. humilis* are among the first of the smaller shrubs to appear on the dunes, and can be found growing in sands where other kinds of vegetation are quite scanty. They blossom when but six or eight inches high, and the common height in these dry localities scarcely exceeds a foot. The stems also are very apt to be supplied with prickles. The Huckleberries and Blueberries are in great abundance. *Gaylussacia resinosa* and *Vaccinium vacillans* require more protected spots for their successful starting than the Roses, but when established cover extensive areas of open land upon the hills or their sloping sides, and are spread abundantly throughout the less densely wooded tracts. *Vaccinium Pennsylvanicum* is less common on the high sand hills, as it takes more naturally to the lower sand ridges or skirts the bases of the hills nearer the supplies of water. New Jersey Tea, *Ceanothus Americanus*, grows promiscuously with the Huckleberries, and sometimes appears in plots which are handsome and effective, both for their numerous racemes of white flowers and bright green foliage. They also preserve their leaves very late in autumn, looking fresh and green after most of the deciduous shrubs have yielded to the frost. All of these small shrubs have a stoloniferous habit, and when fires sweep over them and destroy their exposed portion the subterranean shoot-axes at once renew their stems, which quickly reclothe the ground. They are among the most effective agencies in maintaining the fixity of a dune. *Diervilla trifida* is another pretty little shrub which mainly hugs the bases of the trees or keeps in sheltered spots. To these must be added the humblest shrub of the sand dunes, *Hudsonia tomentosa*, whose prostrate stems, densely covered with fine gray leaves, delight in the most exposed positions in the sand, just as they elsewhere take to the rocks.

Chicago, Ill.

E. J. Hill.

Foreign Correspondence.

Climbing Plants for Tropical Houses.

THE value of climbers for furnishing plant-houses, apart from the attractiveness of the plants themselves, is recognized in many good gardens. They drape the rafters, clothe the pillars and afford shade most effectively when employed with an eye to their habit of growth. The difference between a plant-house devoted to decorative gardening, the roof of which is clothed with elegant climbers, and one in which they are not used is too striking to call for comment. I have seen most picturesque improvements made in conservatories by the mere addition of a few roof-climbers, the shoots of which were allowed to hang loosely. The ugliness of a conservatory roof unfur-

nished with some drapery of this sort is unpardonable. Climbers are sometimes so cribbed and confined by close tying and severe pruning that they do comparatively little toward roof embellishment. Even those plants whose stems are stiff and require to be allowed to grow near the glass to induce them to flower may be made more interesting and useful by releasing the stems and even adding small lead-weights to pull them down while in bloom. *Solanum Wendlandii*, *Allamandas*, *Clerodendrons*, are cases in point. If allowed to grow their own way their flowers develop close to the glass where they are scarcely to be seen from below, whereas an ounce or so of thin lead neatly coiled round the stalk of the raceme when in bud causes it to hang so that when the flowers expand they are in full view. These are details, but their observance makes all the difference between good and bad effect.

Pruning also requires to be done with an eye to the peculiar nature of the plant, and especially to its season and method of flowering. Plants which flower on the young shoots of the current year should be pruned immediately after the flowers have faded. Such plants are the *Bignonias*, *Clerodendrons* and *Hexacentris*. On the other hand, plants which flower on the ripened wood of the previous year's growth should be thinned rather than pruned, and the strongest shoots cut out annually. Of course, many climbers practically prune themselves, or their stems are deciduous.

Almost every one of the tropical climbers named here enjoys a liberal allowance of sunshine. At Kew in the large houses they get no shade whatever, and they grow well and flower freely. Climbers naturally make for the tops of trees where they can enjoy the sunshine. One might say they are climbers because they want sunshine, which in a state of nature they can only obtain by scrambling up and over whatever happens to keep the light from them.

Climbers are a special feature in the large houses at Kew, and this year, owing, no doubt, to the excessive amount of bright sunshine experienced during the summer months, they have flowered profusely, giving the roofs of some of the houses a pleasing and interesting appearance. Many of the plants grown in a botanical establishment are deficient in decorative characters, and this is true of a large proportion of the climbers to be seen in the houses at Kew. But they are all interesting in a botanical sense, and a list of all the climbers grown at Kew would, no doubt, be of some value. Here, however, I propose to name only those plants which are easily grown, flower freely, and when in flower are decidedly ornamental. Some of them are popular favorites, while others are as yet grown only by the few; they are all plants that merit a place among select climbers for tropical conservatories.

ARISTOLOCHIAS.—The best of these are *Aristolochia gigas Sturtevantii*, which for the last month has been a source of as much interest and enjoyment to visitors as the *Victoria regia*, over which the *Aristolochia* stems have festooned themselves and now develop their enormous flowers half a dozen or more at a time. *A. elegans* is a delightful little plant for a pillar or a rafter in a small house, and *A. hians*, with its bright green kidney-shaped leaves and elegant bird-like flowers colored creamy white, with purple-brown veins, is a more useful plant than its near and more robust ally, *A. Brasiliensis*.

ALLAMANDAS.—In addition to the forms of *Allamanda neriifolia*, of which *A. Hendersoni*, *Chelsoni* and *Williamsii* are the best, there is the thin-stemmed, small-leaved *A. grandiflora*, which bears elegant trumpet-shaped flowers of the richest canary-yellow color. It grows weakly when on its own roots, but is robust and healthy when grafted on *A. neriifolia*.

ANEMOPÆGMA RACEMOSUM (*Bignonia Chamberlainii*) is a stout, vigorous grower, its stems attaining a length of twenty or thirty feet in a few months, which in the autumn are clothed with axillary clusters of soft yellow *Bignonia*-like flowers. *A. denocalymna nitidum* and *A. comosum* are near

allies of similar habit and larger flowers of a darker shade of yellow. These are three good-natured plants, growing and flowering freely under even makeshift treatment.

BIGNONIAS.—These include the popular *Bignonia speciosa* and *B. purpurea*, the latter a beautiful summer-flowering climber with flowers of a rich purple color. *B. Tweediana* has small leaves, and its numerous shoots hang elegantly so as to form a screen or curtain which in summer is studded with large golden-yellow flowers. *B. venusta* is a glorious plant when happily situated in a sunny intermediate house, producing large racemes of bright scarlet flowers.

BOUGAINVILLEAS.—We have now four distinct sorts, namely, *Bougainvillea spectabilis* and its variety *lateritia*, and *B. glabra* and its floriferous form named *Sanderiana*. These are essentially sun-loving plants, and when in suitable positions they make a magnificent and lasting display during the summer.

CLERODENDRONS.—Most stove collections contain *Clerodendron Thomsonæ* and the hybrid *C. speciosum*, but the bright blood-red *C. splendens* is a rare plant as yet. *C. volubile*, with very dark crimson flowers, is also rare. Trained to three or four wires stretched parallel with a rafter and grown on what is called the short-spur system, these plants form most effective masses of flowers.

DIPLADENIAS.—These should be grown in a hot moist house and their stems trained on strings till the flower-buds appear, when they may be transferred to a show house and trained round pillars or in any position where their beautiful flowers may be seen. They are now a great attraction in one of the stoves at Kew. *Dipladenias* require very sandy peat and should be potted lightly. They cannot bear sourness of soil or excessive watering. After flowering they should be rested in a dry house.

PASSIFLORAS.—The best of these now in flower at Kew are *Passiflora alata*, flowers four inches across, crimson, with a very conspicuous blue and white corona; *P. racemosa* (princeps), with pendent racemes of brick-red flowers; *P. Raddiana* (Kermesina), a most elegant little plant with bright crimson flowers; *P. Watsoni*, of similar habit to the last, the flowers of two shades of lavender and very fragrant; *P. violacea*, with flowers as large as those of *P. cœrulea*, colored violet-purple, with an almost black corona; *P. vitifolia*, with scarlet flowers.

THUNBERGIA LAURIFOLIA, *T. grandiflora* and its white-flowered variety are three first-rate plants for producing bold effects of foliage and flower. Their ally, *Hexacentris Mysorensis*, is a superb plant for a rafter, its thin, plant stems being easily trained or festooned, and the long, graceful, pendent racemes of orange-red and yellow flowers being exceptionally charming.

IPOMŒA TERNATA.—Three distinct plants are included under this name, all of them first-rate garden plants. They are what are known in gardens as *Ipomœa Horsfalliæ*, with flowers in clusters and colored rich crimson; *I. Thompsoni*, sometimes called the White *Horsfalliæ*, and *I. Lady Briggs*, which has smaller brighter-colored flowers than the last-named and is more easily managed. It flowers in midwinter and is a most useful stove-plant. *I. paniculata* (Batatas), with annual stems and large rosy-mauve flowers; *I. tuberosa*, somewhat similar in growth to the last, but yellow-flowered, and *I. rubro-cœrulea*, the winter-flowering stove annual, which every one grows or ought to grow, are the best of the *Ipomœas*.

BEAUMONTIA GRANDIFLORA.—This large woody climber grows freely under ordinary stove treatment, but it does not always flower satisfactorily. I have never seen it flowered well near London, and I attribute this to the bad effects of fog upon the flowers in winter. But in gardens in the country I have seen plants heavily laden with enormous clusters of large trumpet-shaped, pure white, fragrant flowers, quite equal in elegance and purity to those of *Lilium longiflorum*.

MUCUNA ATROPURPUREA is a vigorous climber, not unlike a Scarlet Runner, and its black-purple flowers are borne in

clusters on slender drooping stalks in such a manner as to resemble large bunches of grapes.

OXERA PULCHELLA is allied to the *Clerodendrons* and produces large axillary racemes of white tubular flowers. *Roupellia grata*, the Cream-fruit of Madagascar, has shining Laurel-like leaves and *Allamanda*-like flowers of a dark crimson and yellow color. *Gmelina hystrix* has the habit of *Bougainvillea*, and bears large, yellow trumpet-shaped flowers in clusters springing from a cone-like arrangement of large brown-purple bracts. *Solandra grandiflora* grows rampantly in any tropical house, but only develops its large white *Datura*-like trumpets when exposed to bright sunshine in a rather dry house. *Gloriosa* is a beautiful little genus, and when properly managed its elegant spider-like red and yellow flowers are very attractive. *Clitoria ternata* is worth growing in every stove for the sake of the rich gentian-blue of its large pea-like flowers. *Arauja grandiflora* (*Schubertia*) is as effective as *Stephanotis floribunda*, and is as easily grown. *Stigmaphyllon ciliatum* and the *Manettias bicolor* and *cordifolia* also deserve mention for their free growth and attractive flowers.

London.

W. Watson.

Plant Notes.

Evonymus obovatus.

THIS plant, which is a native of Canada and of the northern and middle states, has usually been considered a form of *Evonymus Americanus*. It differs, however, from that species in its prostrate or semiprostrate branches, much smaller and earlier flowers, and, as Nuttall pointed out in his *Genera of North American Plants*, is best considered a species.

Evonymus obovatus has been used with excellent effect in the Arnold Arboretum to form a carpet under larger plants and to border the margins of shrub-beds. It grows well in the shade and the full light of the sun. Its cheerful light yellow-green foliage is attractive throughout the season; it is very hardy, free from insect enemies, and when once established grows rapidly into broad dense mats of long, spreading, slender stems. The purple flowers are not conspicuous, but they are followed by fruit covered with prickles and seeds surrounded by showy scarlet arils.

Our illustration, on page 385 of this issue, will, perhaps, serve to attract the attention of gardeners to the horticultural value of this much-neglected shrub.

PHYSALIS FRANCHETI.—Last year Mr. Watson spoke of this as a beautiful border plant with Chinese-lantern-like fruits of a bright orange-red. Early this year we called attention to a colored illustration of it in *The Garden*, in which the brilliant balloon-shaped calyx, seven or eight inches in circumference, made a striking picture, and these fairy-like balloons were said to remain bright after they had been cut a year. It is a near relative of the old-fashioned Winter Cherry, *Physalis Alkekengi*, which is not at all uncommon in American gardens, and it was introduced by the Veitches, of Chelsea, from Japan in 1894. Mr. Michael Barker writes that seeds of the same plant were also received from Japan by Mr. John Lewis Childs, of Floral Park, where it has been grown extensively and proves to be a meritorious plant. In Mr. Childs' garden it grows from twelve to eighteen inches high, erect and densely branched with smooth stems well furnished with ovate, acuminate leaves, the largest of which are six inches long. The dull white flowers with greenish centre are not showy, and are borne singly on short pedicels in the axils of the leaves. The inflated calyces are three inches in diameter when fully grown, and they then turn from their original to the vivid colors we have described. Since it is said to be hardy in England it is probable that the new plant is a perennial like *P. Alkekengi*, but it has been treated by Mr. Childs so far as an annual, and its hardiness and duration here remain to be tested. Plants raised under cover and set out in the open



Fig. 51.—*Evonymus obovatus*.—See page 384.

ground as early as the weather will permit produce from the axils of almost every leaf their large and glowing calyces from the latter part of August onward.

CARPINUS CAROLINIANA.—The American Hornbeam, in

some places called the Blue Beech or Water Beech, is found along the banks of streams from the Dominion of Canada to Florida, and reaches its greatest size in the southern Appalachian region and in eastern Texas and

southern Arkansas, where it is sometimes forty feet high, with a trunk two feet in diameter. It is usually a smaller, closely branched, spreading tree with smooth, close, gray bark and a stem that is fluted and furrowed in a picturesque way. The leaves are dark bluish green in summer, and turn to orange and scarlet late in autumn. Altogether, this Hornbeam, with its airy and graceful crown, is one of the best of the trees of its size for use in our parks and gardens. Like many American trees, it has been neglected by planters, and the European Hornbeam, *Carpinus Betula*, was more commonly planted twenty-five years ago, but our native tree is now obtainable in any good nursery. An Asiatic variety, *C. Duinensis*, has been occasionally grown here, and some distinct and beautiful species in Japan, notably *C. cordata*, have been figured in this journal (see vol. viii., p. 295, and vol. vi., p. 365).

Cultural Department.

Shrubs with Ornamental Fruit.

I NEVER saw the shrubs which are valuable for their ornamental fruit more beautiful here than they are this season. The bush Honeysuckles all summer long have been exceptionally pleasing, and hundreds of people who drive by them stop to express their admiration. Among the best were *Lonicera orientalis*, with black and blue fruit; *L. chrysantha*, from the mountains of Pekin, with fruit as red as coral; *L. Morrowi*, with deep purplish crimson fruit; *L. Bella rosea*, with fruit cherry-red, and the different varieties of *L. Tatarica*, with fruit violet, yellow and other shades of color that it will be hard to describe.

Of the *Viburnums* the first to ripen fruit was *V. Lantana* and its variety *macrophylla*, with berries at first green, then turning into a light rosy pink, and through cherry-red to a true black when fully ripe. The plant has an ever-varying charm which gives it singular value from its flowering season until the end. *V. acerifolium* is also now conspicuous with its purplish fruit; *V. Opulus*, with its brilliant orange and scarlet fruit according to its age; *V. dilatatum*, from Japan, with large corymbs of dark red fruit, which later becomes scarlet; *V. dentatum*, with blue fruit; *V. molle*, with much larger fruit and also bright blue, and *V. Lentago*, with fruit blue-black.

Of the *Cotoneasters*, *C. latiflora* has brilliant scarlet fruit; that of *C. vulgaris* is nearly black, while *C. acuminata* has deep purple fruit. The white-fruited varieties of *Symphoricarpos* are now in their prime, and I think the species called *S. mollis* much finer than *S. racemosa*. The berries are clear white, but more abundant and larger, while the plant is more graceful in its habit. The Spice-bush is now a striking shrub with its scarlet fruit and its leaves changing to yellow. The variety *obovatus* of *Evonymus Americanus* was never as handsome as it is this year. It is a low shrub, planted here on a bank which is somewhat shaded, and being of a trailing habit it has covered the ground, and it now bears much scarlet and orange fruit, which makes a very pretty combination (see p. 385).

The *Cornuses* are all fruiting well. *C. candidissima* was especially beautiful with its scattering bunches of pure white fruit; *C. mascula* is just dropping its brilliant cherry-red fruit; *C. sericea* is covered with its fruits, now blue, then white, while *C. stolonifera* and *C. Baileyi* have clustered fruits of pearly white. Of the climbing Honeysuckles, *Lonicera Sullivantii* and *L. hirsuta* are the finest, the fruit of the latter being purplish red, while the former is a brilliant scarlet. *Ilex lævigata* ripens its fruit early, which is of a brilliant scarlet, showing particularly well among the shining leaves. This, certainly, is a plant which should be more frequently cultivated in parks or gardens, as it is beautiful at all seasons.

Arnold Arboretum.

Jackson Dawson.

Seasonable Work.

THE housing of tender plants now demands attention, for a severe chill is almost as injurious to plants of this character as actual exposure to frost. Among the first to suffer are plants of *Poinsettia pulcherrima* that have flourished outdoors during the summer, their growth being stunted and lower leaves likely to drop off if once chilled. While this injury may not entirely prevent the formation of their brilliant bracts, it will do much toward ruining their usefulness for conservatory decoration. *Cyclamens* also are affected by chilly nights when growing in cold frames, and are much more under control in

a light greenhouse in which a temperature of fifty-five degrees can be maintained. Aphides are likely to be troublesome on *Cyclamens* at this time, unless the precaution is taken to spread chopped tobacco-stems among the pots. This method disposes of these pests quite as effectually as smoking, and with less risk of injury to the foliage or flower-buds.

Bouvardias, *Stevias* and *Eupatoriums* should also be indoors by this time. Nothing is gained by keeping them out later, and their flowers will soon be needed to keep up a regular supply. *Begonias* that have been grown outside in readiness for winter flowering in the greenhouse should also be brought under cover soon after September 1st. These are, almost without exception, heat-loving plants, and are liable to lose some of their roots from a chill. If one is limited in the choice of *Begonias*, three of the most useful species are *B. incarnata*, *B. Saundersii* and *B. corallina*, all of which are easy to manage and extremely free in flowering.

The main crop of *Carnations* in many establishments has, doubtless, been housed before this time, but there is usually some surplus stock after the first selection has been made, and if space can be spared for these in a protected frame, they can be held in reserve until later in the season, when, as pot plants, they will prove useful in filling up spaces formerly occupied by *Chrysanthemums*.

Crotons that have been bedded out (and it may here be noted that their use in this capacity in the vicinity of Philadelphia has again proved highly satisfactory) should soon be lifted, and may be repotted into as small pots as their abundant roots will permit. After becoming established in the greenhouse, they will provide a crop of highly colored cuttings that will make first-rate stock for the following spring.

The various bulbs for winter and spring forcing are arriving now, and these bulbs should be got under ground as soon as possible after they are received, for many of them suffer considerably from over-exposure to the air and light. The earliest, *Lilium Harrisii*, have probably been potted more than a month, and should now be well-rooted and showing their growths above the soil. For Easter decoration I prefer *Lilium longiflorum*, but this variety does not like hard forcing, and, therefore, *L. Harrisii* is preferable for early work. If the *Lilies* are not required to bloom before spring they can be kept in a cold frame having plenty of ventilation, until October 1st at least, and a stouter and stocky growth is thus secured.

A special point to be borne in mind in the treatment of all plants that have recently been brought in from outdoors, is that they still need plenty of fresh air, and, therefore, more or less ventilation should be given during the night as well as the day, in order to avoid a soft and spindling growth.

Holmesburg, Pa.

W. H. Taplin.

Chrysanthemums.

CHRYSANTHEMUMS for specimen plants are now in shape, and the earliest varieties will soon show their flower-buds. Some additional tying will be necessary now. All stray shoots should be pulled into place, so that nearly a globular shape is secured. It is not an easy matter to do this work when the shoots begin to ripen and buds appear, for the reasons that they are less pliable and there is danger of injury to the tips of the shoots. No matter how careful one may be, some of the soft tips are sure to be broken when there is not sufficient time to replace them. A few finishing touches will be necessary a week or so before the exhibitions, but as little as possible should be left until then.

Plants in the open ground should be taken up at once. Cultivation in the open implies more or less naturally grown plants. It will be impossible to get such plants into shape for exhibition purposes, and no matter how carefully the work is done they will lack the trim appearance of continuously trained specimens. But naturally grown plants have a charm all their own. Severely trained specimens impress many persons in the same way as pattern flower-beds. They are too "artistic" or artificial. Unfortunately, untrained specimens, however natural they may look, are usually poorly grown. As much skill is required to grow natural plants as trained ones. They need watching during the whole season. Superfluous growth must be thinned out and light and air let in to the centre of the plant to avoid a skeleton-like appearance, the result of crowded growth smothering the life out of the lower foliage. Attention to the details just noted will secure short, healthy growth and plenty of good foliage down to the ground. Before potting plants from the open ground a piece of string should be put about them, to hold the branches together until the work is done. It is better to stake them into shape at once, so that when they recover they will do so in good order. If

good soil is used very little manure-water will be needed, and certainly none should be applied until the pots are well filled with new roots.

Generally all the shoots on specimen plants bear what is known as terminal buds—that is, the flower-buds produced at the ends of the branches are the last ones the plant makes. They occur in clusters, and all should be carefully removed, except the leading one. The variety *G. Daniels* is an exception. Every shoot on this plant produces a modified crown-bud. If these buds appear well on in September, I take them—that is, allow them to grow by removing the side shoots, or terminals.

Feeding should continue until the blooms begin to show color, but in decreasing quantities and strength. All plants should be housed before there is danger of frost. A slight frost will not injure them, but there is nothing gained by delay. It is easier to control the moisture supply, and at the same time keep the air dry, when the plants are under cover. They should be dried freely, but direct draughts must be avoided, even on bright days, if at all cool, as the liability to mildew increases as the season advances. When the nights begin to get cool toward the end of September a little fire-heat will be beneficial, if only to keep the air in good circulation.

Wellesley, Mass.

T. D. Hatfield.

Orchids in Flower.

Oncidium incurvum.—This is the period when there are fewer flowers among Orchids, and such as are in bloom are the more conspicuous and valuable. *Oncidium incurvum* is one that can be relied on to grow freely and to flower at this season every year; the spikes are a long time developing, often six months, but the longer they are growing the better and larger the spray, for they will sometimes be four feet in length, as we have them now, and covered with side branches that have pretty pink and white flowers that are very fragrant on bright days. It is essentially one of the plants that any one can grow where a warm greenhouse is at command. As the plant is a native of Mexico and Guatemala at considerable elevation, a tropical temperature would be fatal eventually, so a temperature of about fifty degrees in winter is ample, with plenty of air and shade in summer.

Oncidium ornithorychum.—This is another species that will thrive under similar conditions as *Oncidium incurvum*, as it comes from the same localities, and, like it, has flowers that have pink shades, probably the only two in the genus where pink takes the place of the all-predominant yellow that is almost peculiar to the genus. *O. ornithorychum* also has long, much-branched flower-spikes that are produced four, and sometimes more, from a single growth, and when these are covered with rosy pink flowers that are deliciously fragrant, a spicy odor that does not tire, but reminds one of *Heliotrope*, a well-grown plant is decidedly pleasing and a thing of beauty that lasts in good condition for a long time. There is a white variety that sometimes crops up among importations, and it is much valued when one is fortunate enough to obtain it in this way. I saw a superb specimen of it in the noted Measures collection last year that created a sensation when shown in London some time later. There is no difficulty in cultivating this species. We used to grow them in perforated pans, suspended, but when taking them out it was noticed that the roots carefully avoided the perforations and were to be found only adhering to the pan itself, so it seemed reasonable to suppose they did not grow on trees and would prefer an ordinary flower-pot, and those that were tried in this way show a decided increase in vigor; a small plant that was obtained five years ago in a four-inch pot is now a huge specimen in a pot ten inches in diameter, and will in a few days be covered with flowers. This plant grew so well that twelve more were obtained, and there is quite a variation among them as to color. These *Oncidiums* should never be dried off, and before the flower-spikes are much advanced the pots must be immersed in water to get out the slugs, as these are very partial to the tender-growing flower-stems.

South Lancaster, Mass.

E. O. O.

Vegetable Notes.

Celery.—Taken as a whole this has been a very favorable season for Celery here. Little or no artificial watering has been required, and so far the plants are perfectly free from rust or spot. The early supply will now require to be earthed up, but we generally leave this until the last possible moment, as a preventive of rust. For the main crop the first week in

October is early enough to begin the banking-up process, and then just enough to gather the plants into shape.

Lima Beans.—These have been rather slow in filling out, especially those toward the top of the poles, but we find that an occasional soaking with liquid-manure hastens the process. Burpee's Bush Lima proved very useful for an early supply, and, so far as we have seen, it excels all the other bush varieties. It is not quite as early as some others, but the bean is so much larger that it is well worth waiting for.

Onions.—Last year we tried the transplanting method on a small scale, and were so well pleased with the experiment that our main crop was grown in this way this year. The seeds were sown early in March in flats, and as soon as the seedlings were fit to handle they were pricked over into flats again; these were eventually transferred to frames and gradually hardened off until they were planted in the open ground about the middle of April. At the time of harvesting we had onions ranging from twelve to fourteen inches in circumference. The advantage over those sown in the open ground in the usual way was so marked that we will only grow a few of these later for pulling green in future. It may be objected to this plan that it requires more time and trouble, but this is doubtful, the sowing and handling over is done when time can be more easily spared than in the bustle of outdoor spring work; the planting out occupies no more time than the preparing of a seed bed. The ground is merely raked over, the line laid along and the plants inserted in a hole made in the soft soil by the finger. After the line is completed we run along with a foot on each side to make the whole firm and the work is completed. The thinning-out process, which takes considerable time at a busy season, is entirely done away with and weeding is much easier. Any of the varieties can be grown by this system, but for size and quality the *Prizetaker* leaves little to be desired.

Tomatoes.—The outdoor crop is now liable to be cut off at any time by frost, and where a continuous supply is needed a crop indoors should be ready to take its place. This planting sets freely, as a rule, but is so liable to spot that unless it is absolutely required we are inclined to omit it. The younger plants, sown about the beginning of August, will come in for Thanksgiving, and on account of the diminishing brightness of the sun will grow much healthier, and if the atmosphere is kept dry and the house carefully aired there will be little danger from spot.

Lettuce.—Lettuces are always welcome during the winter months. Successional crops may be planted in frames and a sowing made for the first crop indoors. Where space is limited, a plentiful supply can be kept up in frames till Christmas, after which, if the weather be severe, it is somewhat difficult. The old Boston Market is a reliable frame variety, but we prefer *Golden Queen* for greenhouse work, being less liable to damp, and it matures earlier. Where quantity is the object chiefly desired, *Grand Rapids* would probably be the best; though somewhat coarser in texture, the leaves are crisp and juicy, while the flavor is all that can be desired.

Tarrytown, N. Y.

William Scott.

Primroses.—It will be noticed that the hardy species of *Primula* merely eke out an existence through our hot months, and when the cool night dews begin to fall, growth begins at once. We find that this is the best time to lift, divide and replant such as the *Polyanthus*, both double and single, and the Japanese *P. Sieboldii*. We grow a quantity of these hardy *Primulas* both in frames and outdoors for successional flowering, and find them very satisfactory. But they must be treated liberally and not allowed to remain in the same soil for more than a year. At this time the clumps are taken up, carefully divided and reset, three or four crowns together. The soil should be rich. *P. Sieboldii*, being deciduous and having rhizomatous roots, requires a little different handling. The roots of this *Primula* are spread over the surface, and they must not be covered to such a depth as to prevent the rhizomes running freely near the surface, or much of the energies of the plants will be wasted. Owing to this habit of surface-rooting it is not so essential to lift *P. Sieboldii* every year, but a good mulch of well-decayed leaf-mold at this time will serve as a top-dressing and also as a winter protection to any roots that may have become bared of soil through the action of the weather or use of the hose. Of all hardy *Primulas*, *P. Sieboldii* is the best we have tried. It is as bright in its way as the lovely *P. rosea*, from the Himalayas, and much more certain. The flowers are useful for cutting, owing to the long, erect, wiry stems. It has proved perfectly hardy here for several years past.

Lilium Wallichianum superbum (*Lilium sulphureum*).—I notice that this fine hardy Lily has been widely distributed of recent years, and though most of the plants seen in gardens are hardly old enough to flower, the growth made is good and promises to be healthy. This Lily seems even more anxious to reproduce itself than the old Tiger Lily. The smallest stems have young bulbs formed in the axil of nearly all of the leaves. This affords a ready and sure means of propagation, and no time should be lost now in securing them. They drop to the ground at this time and are easily lost if not gathered and planted in a box for the first year's growth. They will be slow to start, probably not before next midsummer. It is best to put them in a cool place under the benches in the greenhouse, or even in a cellar. Any anxiety on the part of a plant to reproduce itself is in most instances a sure indication of either inherited weakness or unsuitable local conditions. I am not sure yet whether this Lily is going to remain permanently as an individual, or if this habit of producing bulblets is characteristic. It appears as though it is, but there is no doubt that the plants would be strengthened by the removal of all the bulblets if it is not desired to propagate them. One bulb would soon produce enough to plant an acre if it was desired. Our original bulb was obtained three years ago, and being weak died after the first season's growth; but from its produce that year we have just gathered over a thousand bulblets, and we have enough now for all purposes. Next year all increase in this direction will be carefully guarded against, and I think the parent bulbs will be benefited thereby.

South Lancaster, Mass.

E. O. Orpet.

Marguerite Carnations.—I consider these among the most satisfactory of half-hardy flowers. To those having a demand for cut flowers during the months of August, September and October (or till Christmas, if potted in September and placed in a cool greenhouse or frame) they are invaluable. A group of them has been flowering in this garden for the past six weeks, and to-day, September 6th, I counted on several individual plants from sixty to seventy-five well-developed buds and blossoms. A great improvement has been made in them during the past few years, and they now almost equal the greenhouse kinds both in size and fragrance. There is a wide range of color among them, and I have not found one with the calyx split. We sow the seeds in pans in a warm greenhouse about the first week in February, growing them along so as to make nice plants by planting-out time. After planting they need to be pinched once or twice to make them bushy, besides a little attention in the matter of staking and watering. They do best in an open sunny position and prefer a light rich soil.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Two Good Roses.—In Willow Grove Park, near Philadelphia, are two beds of Roses, one of La France and one of American Beauty, and it is a pleasure to see how finely they flower. They certainly are among the best of Roses for bedding in this section. A week ago there was not a plant in either bed that did not carry one or more flowers. Many of them had half a dozen each. These Roses are perfectly hardy here, so far as their blooming is concerned. The La France may lose a few inches from the tips of the branches, but this is only a pruning which benefits it. The flowers of both are delightfully fragrant.

Pueraria Thunbergiana.—When allowed to climb over a tree or anything which allows thick massive growth, this Kudzu vine makes no floral display whatever, its flowers being hidden by the foliage. This is not the case when on a trellis or some flat surface. Then its racemes of rosy crimson flowers are well displayed. They commence to expand in the first week of September. For rapid growth this plant has no superior among climbers.

The European Medlar.—*Mespilus Germanica* is a plant which is not supposed to flourish in these parts, but there are small specimens near Philadelphia which are quite healthy and hardy and which bear medlars. The plant should be more widely tested.

Viburnum Lantana.—The beauty of this plant both in flower and fruit has often been referred to. Let me say that *Viburnum continifolium*, a Himalayan species, figured in GARDEN AND FOREST (vol. v., p. 245), is on some accounts still better, although resembling it a good deal. The flowers, foliage and fruit are on a larger scale. The fruit of *V. Lantana* is the later of the two to ripen.

Germantown, Pa.

Joseph Meehan.

Correspondence.

Notes from Southern California.

To the Editor of GARDEN AND FOREST:

Sir,—During the month of June, *Calochortus Plummeræ* is in season, the last of the genus to flower in this region, and though not as showy as some species, it is very attractive. The flowers are of a rich lavender-purple of many shades, with yellow hairs at the base of the petals. I once found a dead stalk which was four and a half feet high and had borne ten flowers. The usual height is from two to three feet. It is found on high hills and ridges, where it is quite dry at the time of flowering. If the stalks are cut when the buds are nearly mature and placed in water in the house they expand beautifully and produce larger flowers than if left on the plant. In rare instances I have found plants bearing flowers of a pleasing shade of salmon-pink.

During the latter part of June and early July is the season for *Delphinium cardinale*. To come upon a large group of this plant in full bloom for the first time is an event never to be forgotten. I first saw a mass of these plants in the distance from the top of a hill. Descending, I came upon them in such a position that the rays of the setting sun intensified the brilliancy of their fiery orange-scarlet color. It has been said that to some persons a red color suggests the sound of a trumpet. Such a one would here have heard the blare of a thousand trumpets. I gathered a large armful of stalks from three to seven feet high, and on reaching home placed them in a Mexican water-jar standing upon the floor. With the addition of some finestalks of the lovely white *Romneya*, the starry white flowers of the "Soap-plant" and some tall wild Grasses, a floral piece was made which might please the most fastidious. The *Delphinium*-flowers continue to expand for several weeks in water. The roots endure great drought, becoming brittle as pipe-stems, yet starting readily on the arrival of the rainy season. It flourishes only in sandy or decayed granite soil.

It is interesting to note the variation in color of some California plants. *Mimulus viscosus* in the type has flowers of a rich buff-orange. In the high mountains a form is found with primrose-yellow flowers, and in one instance I found a plant bearing flowers of a French white, and in another locality a plant bearing flowers of a brilliant rust-red, a most distinct and pleasing shade. In rare instances plants of the type are seen in our gardens, where they flower throughout the year.

One of the most notable sights in southern California gardens in summer-time is the Australian Flame-tree, *Brachychiton acerifolium*, in full flower. In the garden of Mr. C. H. Richardson, of Pasadena, is probably the finest specimen in this region. The tree is of fine pyramidal shape and about twenty-five feet high. At the time of flowering it is entirely destitute of foliage, but is literally covered with bloom. Every branch and twig is terminated by loose spikes of flowers about half an inch in diameter, in shape somewhat resembling Lily-of-the-valley. Their color is the brightest vermillion. Such a gorgeous spectacle is worth a long journey to see. At all other times the tree is covered with rich green foliage and is very ornamental.

I will bring this "scarlet letter" to an end by noting that I have succeeded in flowering the rare *Gerbera Jamesoni*, from south Africa. The plant is not yet well established, but produced a solitary flower two and a half inches across. The rays were somewhat narrow, but otherwise the flower resembled a Marguerite or a field Daisy. It was of a bright orange-scarlet color and very handsome. This color is very rare in the *Compositæ*, and should the plant prove a good grower here it will be a welcome addition to our gardens.

Los Angeles, Calif.

Edmund D. Sturtevant.

Utilizing Choke Cherries.

To the Editor of GARDEN AND FOREST:

Sir,—The Choke Cherry grows abundantly about here, along fence rows and in the edges of woods. It seems to have a preference for sandy soils. In certain favorable locations it bears enormous crops of fruit. Certain plants seem to be more prolific than others, and there is a noticeable amount of variation in the size and quality of the fruit. Frequently one will find clumps of bushes from which several bushels of really fine fruit might be gathered. For the most part, however, it entirely goes to waste. It is not even used by the birds or the curculios. It seems really a pity to see so much fine fruit spoiling unused.

For the sake of seeing what might be done with this fruit, a quantity was taken this summer and made up into jelly. The result was gratifying. There was not a large amount of the jelly, but the quality was superior. The clean flavor of the bitter almond characterized our samples, which were sweet and fruity besides. The flavor was altogether desirable. The texture was somewhat coarse and grainy, owing, perhaps, to the fact that the fruit was overripe. The jelly was also dark-colored, probably owing to the same fact.

There are many places, in this vicinity at any rate, where the fruit of the Choke Cherry could be picked in large quantities with ease; and, so far as the result of our small experiment may indicate, it would be altogether worth while to gather it and make it up into jelly.

Vermont Experiment Station.

F. A. Waugh.

The Forest.

The Burma Teak Forests.—VIII.

LINEAR VALUATION SURVEYS.

THE reader may justly ask, what can possibly be the object of filling the pages of GARDEN AND FOREST with these dry facts and figures relating to Teak in Burma, a tree which does not grow in the United States, and which could not possibly be grown as a forest tree if the attempt were made?

American foresters are practical people, and though some of them, doubtless, honestly desire to manage their forests upon conservancy principles, they naturally are impatient and wish to attain results as speedily as possible. It being known that the system of linear valuation surveys made it possible forty years ago in the Teak forests of Burma to organize the working of these forests on a plan which has stood the test of experience, it is but natural that the adoption of a similar system in the United States should have been contemplated. Hence, it may not be out of place to explain the conditions under which the adoption of that system would not be advisable. In forests where one species predominates, such as the Redwood forests of California, or where the constituent species are all marketable, it will generally be found most convenient at the outset, and before special working plans are made, to regulate cuttings by area. In such cases each forest division would be divided into a number of blocks of approximately similar productiveness, one block being taken in hand annually for the cutting and extraction of the mature and marketable timber in it. What proportion of the marketable trees should be cut, and the selection of the trees to be felled, must depend upon what is known regarding the natural regeneration of the forest, the rate of growth and other considerations. The main point, as a matter of course in all cases, must be so to arrange cuttings as to ensure the maintenance and the regeneration of the forest. In forests, on the other hand, where the marketable kinds only form a small proportion of the growing stock, it will often be difficult to regulate cuttings by area, and in such cases it may be expedient to endeavor, by means of linear valuation surveys, to obtain a general idea regarding the growing stock of the different age classes, and, guided by the results thus obtained, to regulate the cuttings by volume—that is, to fix a maximum number of trees to be cut annually within a certain area. In Burma no other method was possible at the outset, but elsewhere circumstances may be different. Thus, in the Alleghanies, where the Yellow Poplar is the most valuable, and may in places at present be the only marketable species, this tree may possibly be found in scattered patches of varying extent, Liriodendron being the principal tree in these woods or patches, while in the remaining forest area this species would be absent, or nearly so. In that case the results of linear surveys would be misleading, and other methods must be devised. In any case it should be distinctly understood that linear valuation surveys were employed in Burma at the outset only, and that when special working plans were prepared for forest districts of moderate size the estimate of the growing stock was formed on the ground of sample areas carefully selected, so as to represent approximately the constitution of the entire forest.

WORKS OF IMPROVEMENT—CUTTING OF CLIMBERS.

It has been shown that the condition of those forest tracts in lower Burma which have lately been examined in detail, and which, therefore, are best known, has greatly improved as far as Teak is concerned, particularly as regards the younger classes. This improvement could not have taken place had not girdling operations been made sparingly and had not the

selection of the trees girdled been governed by correct principles. This favorable result is, however, also due to the works of improvement that were undertaken—that is, to the care bestowed specially upon the Teak in the forests. One of the features which at once struck me forcibly in those forests was the large number of huge woody climbers, the stems not seldom one hundred feet long, as thick as a man's leg, but as flexible as a rope, their tops twisting round stem and branches of Teak and other trees, and their luxuriant foliage smothering the crown of the trees on which the creeper had settled. Botanically, these creepers are most interesting; they belong to a large number of families, many bear a profusion of gorgeous flowers; in all of them the structure of the stem, the circulation of the sap and their mode of growth and development present interesting and most important problems, but the mischief they do is very great. The tree to which one of these woody climbers has attached itself gets bent, forked and twisted; it is badly shaped, remains stunted and is often killed. Hence, I determined at once that these pests should be destroyed throughout the Teak-producing tracts. Fortunately, this work is not difficult; the stems of these creepers are soft, and I soon found that it gave my Burmese companions considerable pleasure to cut them with their long, stout, sabre-like knives. The rule which I established was that when girdling operations were carried on in any district all climbers on Teak-trees should be cut, and it was made the duty of the local native foresters to keep the Teak in their districts clear of creepers.

The battle which I waged against creepers in Burma has not, it is true, led to a complete extirpation of these interesting plants. Readers of GARDEN AND FOREST will still be able to see a good many of them should they visit the forests of Burma. More perfect success was attained in this respect in another part of India at a later date, under my advice, by my younger friends in the forests. In 1875 a valued friend of mine came from England to see how India was progressing, and, among other things, to understand what we were doing in the forests. At that time I happened to be in the Dèhra Dû, a large forest district mainly consisting of Sal, Shorea robusta, at the foot of the Himalaya. Ever since I had first visited these forests in 1863 I had resolved at that place to establish a forest school for the natives of India. I had, however, determined not to take any steps in this direction until my friends, who had charge of these forests, should have succeeded in bringing them under efficient protection and a regular system of management. Example is better than precept, had been my motto all through my Indian career, and I had determined that the training at that school should be chiefly practical. This, however, was impossible without forests in good condition and under systematic management as the training-ground for the students. In 1878 I succeeded in obtaining the sanction of the Government of India to the establishment of the Dèhra Dû Forest School, but in 1875 considerable progress had already been made in the improvement of the forests.

My friend took a special interest in botanical matters, and I naturally wished to show him some of the gigantic climbers of the forests—*Butea superba*, with its gorgeous orange-colored flowers; *Bauhinia Vahlia*, with its irregularly ridged and furrowed stem, its impenetrable net-work of twigs and branches and its dense foliage. Not one was to be found; they had all been carefully extirpated. My friend, now the Right Honorable Sir Mountstuart Elphinstone Grant Duff, saw that the forests were well cared for, but the readers of GARDEN AND FOREST will sympathize with his disappointment at not seeing either *Bauhinia Vahlia* or *Butea superba* hard at work throttling the Sal-tree.

More difficult to deal with were Epiphytic ficus, the seed of which germinates on a branch or in a fork of the tree. The Epiphyte at first grows very slowly, but afterward draws abundant nourishment from aerial roots sent down into the ground, and finally tightly encloses the trunk of the Teak or other trees with a net-work of anastomosing roots, forming a thick woody sheath round the stem. Another important work that was undertaken, to favor the development of the Teak-tree, was to cut down or to girdle other trees overshadowing young Teak and to clear away heavy inflammable matter—wood, branches, dry brushwood—lying on the ground in the vicinity of young Teak-trees, especially if standing in groups. Considering the large extent of the Burma forests, these operations could not, as a matter of course, be carried on uniformly all over the area, but the beneficial effect of what had been done I noticed with satisfaction on each successive visit to the forests in 1868, 1876 and 1880, after I had relinquished my original charge.

Bonn, Germany.

Dietrich Brandis.

Notes.

The *Rural New Yorker* speaks highly of the McPike Grape, originated by a vineyardist of that name in Alton, Illinois. It is a seedling of the Worden, hardy, with good leaves, large compact bunches of even size, berries with a blue-black bloom and ripening uniformly. The berries are of the largest size (three inches in circumference) and extremely juicy. The skin is thin, but not tender, the pulp is melting and the seeds are small and few. It is spoken of as an improved Eaton.

In the Museum of the Oxford Botanical Garden there is preserved a primitive utensil which was once used to protect greenhouse plants from cold in frosty weather. This is an open wicker box fixed upon four wheels. It used to be filled with red-hot charcoal and the gardener rolled it backward and forward in the glass-house throughout the night during severe weather. A correspondent of the *Journal of Horticulture* speaks of this as a very interesting reminder of the development of the apparatus for heating glass-houses.

For some reason probably connected with the hot summer and heavy rainfall, mushrooms are unusually abundant in the pastures and meadows about this city. In Dutchess County the farmers and others gather them and carry fine ones around to the different towns and villages for sale, and they are so abundant they are offered in quantities at thirty-five cents a bushel. The *Poughkeepsie Eagle* reports that not only true mushrooms but many other fungous growths, both edible and poisonous, are common in all parts of that city.

When seen in masses in their native homes Sobralias are among the most beautiful of Orchids, as various travelers have borne testimony. We learn from the *Orchid Review*, and record it as a matter of interest, therefore, that Mr. F. J. Le Moyne, of Chicago, is trying to make a complete collection of these plants. Most of the species are handsome, although they are not so much cultivated as they would be if their flowers were not so fugacious, and, in some cases, if they were not so large. The long succession of flowers which they bear compensates in some degree for the first effect.

Mr. W. Botting Hemsley, in writing of plant distribution in *Knowledge*, calls attention to the fact that Lord Howe Island, a speck of land less than a quarter of the size of the Isle of Wight, situated in mid-ocean, three hundred miles from the coast of New South Wales, produces four species of Palms peculiar to itself. The Seychelles group in the Indian Ocean is also interesting. These islands, more than thirty in number, are situated six hundred miles north-east of Madagascar, the largest being seventeen miles long and five miles wide, with an altitude of nearly three thousand feet. Three hundred and fifty species of flowering plants and Ferns are recorded from these islands, one-sixth of which have not been found elsewhere. Among the latter there are nine distinct kinds of Palms, and seven of these have not been found elsewhere, and among the latter class is the famous double Cocconut or Cocoa de Mer.

This is the season of Sunflowers, and wherever a mass of yellow is needed they will never be a disappointment. In the herbaceous garden at Prospect Park the tall stalks of *Helianthus orgyalis*, in full flower from top to bottom, which means for a distance of ten feet, are very striking when standing against the dark green of the still taller *Arundo donax*, while the common Artichoke, *H. tuberosus*, is by no means to be despised. *Helianthus mollis* is a lower plant, two or three feet tall only and bearing light lemon-yellow flowers with a yellow disk and soft woolly-white leaves, while *H. rigidus*, with rich orange-yellow flowers, and rather a taller plant, would grace any garden. Besides these, *H. multiflorus*, which continues in bloom for a month, with its double variety, which flowers all summer long, *H. decapetalus*, the semi-double cup-shaped *H. lætiflorus*, with many rather coarser ones, are all useful in large wild gardens. These, with *Heleniums*, *Rudbeckias* and *Silphiums*, with their light yellow, almost straw-colored flowers and varied leaves, will suffice to make any border gay till mid-September, after which there are later varieties of almost equal merit.

The Pollination of Plums is the subject of Bulletin No. 53, issued by the Vermont Experiment Station, and prepared by Professor Waugh. Plums are uncertain in setting fruit, and this is partially due to lack of proper cross-pollination, and therefore different varieties should be planted together or scions of other varieties should be set in the tops of trees which do not bear satisfactory crops. This cross-pollination

is provided for by the defectiveness of their floral parts and by the sterility of certain varieties toward their own pollen. American cultivated varieties have been derived from several botanical species, and these varieties retain, to some extent, the characters of the parents, and it is thought that botanical relationships will prove the best guide in cross-pollination. A very interesting account of the economic characters of the different groups is given, but it is admitted, after quoting the opinion of eminent horticulturists and botanists, that there are many questions, practical and theoretical, which are still open to investigation. Some of these questions are asked at the close of the bulletin, and readers are requested to make a reply. The statement that the Beach Plum, *Prunus maritima*, is of little importance for its fruit, although desirable for ornamentation, ought, we think, to be modified. We have seen individual trees of this species which bore fruit of beautiful color and rich flavor, and it seems to us that both in the line of selecting and hybridizing it is a promising tree for fruit. The bulletin is commended to all who wish to grow trees intelligently.

Chautauqua growers are complaining that they hardly get enough for grapes to pay for transportation to market, and in some sections farmers are allowing their apples to lie on the ground and rot or they feed them to hogs. This means that in many districts the fruit crop is uncommonly abundant. Nevertheless, the prices for fine fruit on the street-stands and in the fancy-fruit stores were rarely, if ever, higher than now. It ought to be added that the quality of the fruit offered has, perhaps, never been as good. The lesson of all this is that the only assured success for fruit growers is by careful cultivation, thinning, etc., to insure fruit of the very best quality, and then to withhold everything that is not strictly first-class. In spite of the surplus of ordinary grades of fruit and of the limited demand for fruits of the highest grade, it is evident that there is considerable margin for profit between the prices farmers receive and those the consumer pays. Among the showiest fruits now offered are immense Salway peaches, measuring fully seven inches around, the downy skin a cream-yellow, with bright crimson cheek. Persimmons, from Florida, are already quite abundant, and large, luscious specimens of a rich golden color cost sixty to seventy-five cents a dozen. As many as forty shipments of Alligator pears have been handled by one of the down-town retail fruit-stores since the beginning of the season in May, when this fruit came from the United States of Colombia. Later, Jamaica and Cuba furnished the supply, and from August to the close of the season in October they are received from Turks Islands, among the Bahamas. The demand for this fruit is reliable, and even now, near the end of the season, when the specimens are no larger than a good-sized Bartlett pear, they readily command from twenty to thirty cents each. Mangoes, which are also passing out of season, have eager buyers among persons familiar with this variously flavored apple of the tropics. An importation received from Cuba last week sold on sight at retail at ninety cents a dozen for the entire lot. The first cargo of Almeria grapes of this season, consisting of two thousand barrels, is now on the way to this country.

William Robinson, who for nearly twenty years has been at the head of the famous Langwater Gardens, belonging to Mrs. F. L. Ames, North Easton, Massachusetts, died of pneumonia on Wednesday last in the full vigor of his manhood at the age of forty-five years. Mr. Robinson was born in Bedel, Yorkshire, England, and learned his craft in such good gardens as those of the Duke of Cleveland and Sir Titus Salt, and he spent some years at the Veitchian Nurseries. He was a thorough gardener, well skilled in every department of his art, but he was especially noted as an expert in the cultivation of Orchids, and it will be difficult to find a successor who can worthily fill his place in charge of the most valuable collection of these plants on this continent. Mr. Robinson was more than a mere cultivator, and by his skill in hybridizing he has produced many interesting crosses. Some of his hybrid *Cypripediums* it would be almost impossible to duplicate, owing to the rarity of the parent plants. He was very successful with *Masdevallias*, which are somewhat difficult to manage in this climate, and several excellent hybrids of this genus originated by him have been distributed. Mr. Robinson was an occasional contributor to these columns, and what he had learned by study and observation he took care to write with clearness and accuracy, and he was always ready to give information from the abundant stores of his experience. He not only loved his work, and was loyal to his art, but he compelled respect by his straightforward honesty and manliness of character.

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Agricultural Depression.

AT a recent session of one of the schools of horticulture which are held in the different counties of this state under the Experiment Station Extension Bill, Professor Bailey departed from the customary order of procedure in these institutes and talked for a short time on "The Farmer's Trials." The unusual sluggishness of trade, commerce and all productive industries now prevalent, no doubt, warrants the discussion of topics of this sort on such an occasion, and although a consideration of such problems is foreign to the general purpose and spirit of these columns it may be worth while to call attention to certain conditions which have helped to bring about the existing agricultural depression in this country and in a large part of Europe. The trials of the farmer during the hard times have not been exaggerated, and he is driven into his present straits by poor prices and not by poor crops. Professor Bailey protested in the first place, however, against the prevalent idea that farmers are suffering more than other members of the community. In the general stagnation of business his profits have fallen like those of the manufacturer and every one else, and he is no worse off radically than his neighbor. There is no special road to renewed prosperity for the farmer unless the condition of the whole country is improved, and any legislation designed to aid farmers as a class would be not only ineffective, but pernicious. There are failures among tradesmen as well as foreclosures of mortgages on farms, and if tradesmen, as a rule, were as slack in their business methods as farmers mercantile failures would be much more frequent. The farms of New York state average from \$3,000 to \$5,000 in value, and with this capital invested prudent farmers are able to support their families, while it is doubtful if the same amount of capital invested in business would average as much. Professor Bailey added that under the Homestead Act, which, as we look back upon it, was a singularly unwise measure, great areas of free and railroad lands were taken possession of by numbers of emigrants who rushed into the west to make homes for themselves. The area of cultivated land increased at a much more rapid rate than the population grew, and a surplus of breadstuffs soon caused

depressed prices. Since the greater part of our arable lands are now occupied, the population is growing more rapidly than the area of cultivated land is expanding, so that we may look for the time in the near future when the demand for food will, in some measure, equal the supply, and then the stringency will cease and the farmer may expect a greater reward for his labor.

Whether this prediction is fulfilled or not, the statements on which it is based are strictly true. Since 1890 the wheat production of the country has been more than twice as great as it was in 1870, and there is no doubt that these large crops, added to the millions of bushels which are exported from India and the Argentine states, have supplied the world with more wheat than it can eat, or, at least, more than it is willing to pay for, and to this it must be added that Russia, Hungary and Spain have multiplied their production still more rapidly, while Australia threatens to put millions of bushels upon the markets of the northern hemisphere. But this is only one factor in a great change which has been going on all over the world during the last half of the century. In agriculture as well as in manufactures, science with inventions, which come from increased knowledge, have so cheapened production of every sort that the world we live in is quite a different one from the world of the early years of the present century. Machinery has so multiplied the power of a single man to cultivate and harvest and transport crops that a bushel of wheat can be raised, harvested and turned into flour in the distant west at less cost than it could be raised a few years ago in the rich Wheat-fields of northern New Jersey or Pennsylvania, and it costs actually less to put flour into the New York market from Minnesota than it cost our fathers to carry it fifty miles. With sulky-plows and horse-cultivators, with cheap fertilizers and a knowledge of how to apply them, the market-gardeners and truck-farmers of Virginia and southern New Jersey, by the aid of rapid transit, can sell fresh vegetables at a profit in this city for less money than they could have afforded to sell them on their farms a few years ago. It is owing to this cheap transportation that the fruit growers of the east are compelled to compete with a thousand car-loads of fruit brought into this city every year from California. When early apples from Canada come into competition with late winter apples from Australia in the English market, and perishable fruits, like plums and peaches, raised in California, are sold in Liverpool, it is evident that the element of distance between the producer and consumer of agricultural products is practically annihilated.

Much truth is written nowadays about careless farming, but it is equally true that the farmer raises better domestic animals, that the vineyardist and orchardist produce better grapes and better fruits and more of them, that the market-gardener and truck-grower produce vegetables and small fruits of better quality and in much greater quantity than they did a few years ago. All this means that there is an enlarged market for our orchards and our vineyards, our farms and our gardens, and that modern science has enabled us to produce more on every acre and with less outlay than we once did. These are precisely the conditions which the cultivators of the soil were hoping and praying for fifty years ago, and yet they are the very conditions which are now helping to bring on the low prices of which complaint is made.

And what of the future? Very clearly, we may expect a still greater advance in agricultural and horticultural science and practice in the years next ensuing. Phosphates from rock and potash from the Stassfurt mines are already cheap, and even now it is announced that German investigators are on the eve of perfecting processes for drawing upon the vast stores of nitrogen in the air so as to make that most expensive element of plant-food as cheap as the others. Professor Nobbe, of Saxony, the distinguished plant physiologist, claims that he has produced on a commercial scale pure cultures of the different bacteria which are efficient in fixing the free nitrogen of the air in a form available

for plant-food, and has them for sale in small glass bottles. We have no means of estimating the value of the alleged discovery, but it has been considered of sufficient importance to be made the subject of more than one paper read before the Royal Agricultural Society of England. It is claimed that the soil can be inoculated with these organisms for the modest sum of \$1.25 an acre, or the seed itself may be inoculated before it is sown quite as cheaply. Of course, it may be premature to place much confidence in this new method of securing fertility, but it has long been considered probable that some means of utilizing the stores of nitrogen in the air could be devised, and we may reasonably expect more wonderful discoveries since so many men of science are engaged in the experiment stations of the world in studying the laws of plant-life. Certainly it cannot be assumed that the further cheapening of food-production is an unmixed evil, and yet until the cultivators of the soil can adjust themselves to the new state of things this would certainly affect their prosperity. Synthetic chemistry has gone so far as to prophesy a time when fruits and vegetables can be produced at little expense in a laboratory from their original elements, instead of waiting for the slow processes of nature to perfect them. Even if this dream were realized it might be a blessing and not a curse, and yet it would bring temporary disaster upon the tillers of the soil.

We have little expectation that the time is at hand when man will cease to earn his bread by the sweat of his brow, but we hardly ought to complain if he earns it with less sweat than he once did. Certain it is that great changes in the lines we have indicated are in progress, and they cannot be arrested by any legislation which changes tariffs or affects the volume of currency. Professor Bailey is right in saying that if this depression continues, its first effect will be to refine the gold—that is, to drive out of the business all but the most skillful producers of crops. Meantime the farmer must be alert to adjust himself to his new surroundings; he must be content as manufacturers and merchants are to make a living and keep out of debt; he must do his work intelligently and avail himself of every new aid which science offers; he must keep his land in good heart, grow only as much as he can grow with some degree of profit, live quietly and economically, and then wait.

An Experimental Grove of White Pine.

MR. B. E. FERNOW, Chief of the Bureau of Forestry, referring to a grove of Pines with which I have been experimenting for more than twenty years, says in *GARDEN AND FOREST* (see p. 202):

Mr. Lyman has a growth of White Pine two-thirds of an acre in extent, fifty to fifty-five years of age, which he has thinned, so that in 1894 only 146 trees remained, or 223 to the acre. Most of his trees are over ten inches in diameter, at least sixteen of them are over fourteen inches, and the best measured 22.2 inches, the height being seventy to eighty feet. The calculated volume corresponds to a production of 7,185 cubic feet of wood an acre, which, under very careful practice, might cut 30,000, board measure.

In view of the vast value and importance of the White Pine and the rapidity with which a timber crop of it can be grown, even on land deemed almost worthless, I have been experimenting on a small scale to ascertain its rate of growth and the best treatment of the trees while growing. In this study I have been disappointed at finding so little aid from books. I want to find out how to grow a crop of timber on poor, cheap land as well as the best farmers in the Corn belt can grow a crop of corn. I have some four hundred acres of mixed young growth from twenty-three years to thirty-five years of age, and most of this has been left to nature. I have thinned some twelve acres of small White Pines and pruned some of them. The little grove referred to by Mr. Fernow is upon a deserted farm which I bought in January, 1870, and, as I remember, the first time I noticed it was a few years later. The trees are close by

the highway, less than six miles from the large village of Farmington, less than a mile and a half from a railroad station, and fourteen, twenty and twenty-five miles respectively from the cities of Rochester, Somersworth and Dover; yet this grove with its 108 square rods of land could not probably have been sold at that time for much, if any, over one dollar, and, perhaps, for not over fifty cents. A man thinned the trees, receiving the thinnings as pay, and they made stakes, kindling-wood and, perhaps, a few light top poles for fence. They ought to have been thinned earlier. They were then left either five or seven years, which was too long, before they were thinned again. They have been irregularly thinned from time to time since, and the pruning has been equally irregular. Standing more than forty miles from my home, they have not been as well cared for as they ought to have been. They have no limbs within twenty feet of the ground, and the first twenty feet from the ground will make very good boards, worth, if cut now, at least twice the price of inch-thick box-boards. The larger these trees become the more clear lumber there will be in them, and its value per foot will increase with their size. I have other young Pines on the same farm which I have pruned, so that the logs from the first twenty feet of their bodies will be perfectly free of knots to within about two inches of their hearts, and these knots will be so small, free from blackness and sound, that they will scarcely be noticed in the boards. The cost of the several prunings of each tree will, I judge from my experience, amount to about one and a half cents. It would be a fast average growth with properly thinned Pines if they were two feet in diameter at seventy-five years of age. The most profitable number to the acre at this period of their growth I have not satisfactorily determined. Perhaps 130, or possibly 150, and the amount of lumber from 60,000 to 80,000 feet, board measure, with all of that from the butt logs of very superior quality and the remainder sound, with the ordinary amount of knots. The amount of wood, fencing, shingle stuff, box-board logs and timber cut out in thinning such a forest or plantation is immense. The saving in cost of getting lumber from such a clean forest, where every tree is a Pine fit to cut, instead of having to cut paths through trees and brush, and break them through deep snows to get scattering trees from among mixed growths is a very important item. For this and other reasons I prefer to have unmixed timber lots and no undergrowth.

Mr. Fernow and I do not agree as to the amount of timber to the acre upon my poorly cared for experimental grove (see page 202). In June, 1894, his assistant, Mr. Carey, measured the trees and sent his figures to Mr. Fernow, who, in a letter dated six days later, wrote, "practically you will not get more than 10,800 feet, board measure," on the 108 square rods, which is 16,000 feet to the acre. In the same letter he expressed the opinion that I ought to have four times as many trees on the plot as actually stood there.

From Mr. Fernow's estimate of 10,800 feet, board measure, for these 146 trees, or 16,000 to the acre, in his letter to me dated June 29th, 1894, he has raised his estimate in *GARDEN AND FOREST*, page 203, to 30,000 feet to the acre. At this ratio his next estimate would, I think, be too high, but nearer the true amount. Cutting one of the largest and one of the smallest of the trees growing on the inside of this grove, I had them sawed into inch boards with a thick circular mill saw, and the two made 500 feet. In my judgment these trees would be a fair average for all, and if so, they would saw out 54,750 feet to the acre. I reckon only 219 trees to the acre at the rate of 146 on 108 square rods. To be within bounds, I estimate 50,000 feet to the acre. In our *Agricultural Report*, written in February, 1895, I estimated the age of these trees at about forty-eight years. I now count it fifty years. The youngest are less than forty, but the larger one sawed had fifty-four rings in the low-cut stump, and, as I have learned by observation and by sowing Pine-seeds, that Pines start slowly, I think it likely that the seed started three years before it formed

the grain I found at the heart of the stump. I want to keep within bounds. Two good judges well acquainted with this grove think my estimate of the amount of timber too low. An acquaintance of mine lived on the farm with his father and helped mow the land where these trees stand in 1835, and there was, he says, no sign of a Pine there then, and he thinks the land was mowed several years after. That land so sterile and stony should ever have been mown shows the cheapness of labor and the poverty of its owner. Badly as this grove has been treated and neglected, it must be pretty safe to say that, besides all the wood, fencing, shingle stuff and timber cut out in thinning, it has at the rate of as many thousand feet of lumber to the acre as the trees average years of age, yet New York alone permits 867,000 acres of its territory, much of it undoubtedly better land for timber than mine, to lie in idle wastes and purchases many million feet of lumber annually from Canada. Why will not agricultural colleges or somebody teach the people how to increase the value of waste lands of New York, for instance, in a comparatively few years, a hundred of millions of dollars and add greatly to the beauty of her landscape?

Exeter, N. H.

J. D. Lyman.

The Sand Dunes of Northern Indiana and their Flora.—IV.

CNICUS PITCHERI is an herbaceous plant which early gains a foothold in the sand. It is very singular in appearance, the densely hoary stem and leaves forming a pale object resting on the sand. It is usually isolated, the branching stem when in flower a foot or two high, but with a root going downward several feet. As an early companion we shall find *Solidago humilis*, particularly the variety *Gilmani*, with virgate stems sometimes three feet or more in length. Another common Golden-rod is *S. speciosa*, var. *angustifolia*, the handsomest of all that appear on the dunes, with its long panicle of bright yellow flowers, with *S. nemoralis*, in great variety of individual forms, equally at home. Much less common are *S. rigida* and *S. tenuifolia*, and *S. cæsia* comes in where shade is found. The Asters do not number many species, but the drier sands make a home congenial to such kinds as *A. linarifolia*, *A. ptarmicoides* and *A. multiflora*. *A. azurea* is frequent in the copses and open woods, and on more closely wooded hills or shaded spots the arrow-leaved and the heart-leaved Asters are found. *Kuhnia eupatorioides* appears, having more slender stems, narrower and less dentate leaves and fewer heads than in the form growing on the prairies. *Liatris scariosa* and *L. squarrosa* are conspicuous with their bright, showy spikes, handsome here and worth a place in any garden. *Artemisia caudata* flourishes on the driest banks, a plant with finely cut, but dull foliage. In the spring and early summer the little annual *Krigia Virginica* sometimes makes dense beds of yellow flowers on the sunny hillsides. It is heliotropic in habit, each little head of flowers bent upon the stem to face the sun. *Helianthus divaricatus* is the most common Sunflower. It is generally low and slender, one and a half to three feet high, often with an unbranched stem crowned by a single head. *H. occidentalis* is native to such places. *Lepachys pinnata*, with long drooping rays of pale yellow, is frequently seen on the open hillsides. *Rudbeckia hirta*, *Coreopsis palmata*, *Prenanthes aspera* and several of the Hawkweeds are also present. One of the earliest plants to appear in spring is the little Everlasting, *Antennaria plantaginifolia*, covering some sterile knoll with silky stems and leaves.

The Birdsfoot Violet is the first of the genus to bloom in spring. It is very abundant in most sunny spots, delighting in a south exposure. Its bulbous root fits it to withstand the heats of summer, and in early autumn, after a warm rain, it is frequently seen putting forth new leaves and flowers. It is the only representative of the order, except an occasional Arrow-leaved Violet, or sometimes a

Blue Violet. The yellow, fugacious flowers of the Frost Weed, *Helianthemum Canadense*, are very pretty for the few hours they last, and are common in such spots as the Birdsfoot Violet frequents. The most abundant cruciferous plant is *Arabis lyrata*, its white flowers seen everywhere in open spots throughout the woods in early spring. One of the Whitlow Grasses, *Draba Caroliniana*, sometimes accompanies it, coming into bloom some years in March, and a small, hairy Forget-me-not, *Myosotis verna*. Later in the season we find *Arabis hirsuta* and the Sickle-pod, *A. Canadensis*, usually in more sheltered places or in the shade of trees. With them may be associated two of the Galiums, *G. pilosum* and *G. circeæans*, their shapely, symmetrically arranged leaves always making them attractive. The Early Crowfoot, *Ranunculus fascicularis*, delights also in the dry hills, especially in spots which may have become a little grassy. The cylindrical heads of *Anemone Virginiana* and *A. cylindrica* are often seen peering out from the low bushes on the slopes, and in some wooded places we meet with the Wind-flower, *A. nemorosa*, and with *Anemonella thalictroides*. Both forms of *Hepatica* also occur. The handsome flowers of *Aquilegia Canadensis* are abundant in their season, the plants being sometimes massed, but oftener scattered over the sides of the steeper slopes. It is usually accompanied in such spots by the Harebell, *Campanula rotundifolia*.

Though the Pulse family are not largely represented by species, some are very numerous. This is especially true with the Wild Lupine, though it is most abundant on the lower sand reaches where the timber has been partially removed, and where the showy flowers are seen in May and June almost covering the ground by the acre. *Tephrosia Virginiana* is common, as well as *Lespedeza capitata* and *L. polystachya*. The Lead-plant, *Amorpha canescens*, is also found, and several kinds of *Desmodium*. Of the Pink family, we may see *Silene stellata* and *antirrhina*, and the Sandworts, *Arenaria Michauxii* and *lateriflora*. Of *Polygala*, we find *P. polygama*, *P. verticillata* and *P. Senega*. Herbaceous *Rosacæ* are mainly represented by the Strawberry, *Fragaria Virginiana*, and some of the Cinquefoils, *Potentilla Canadensis*, *arguta* and *argentea*. Of *Saxifrages*, *Heuchera hispida* occurs, and on shaded hillsides *Mitella diphylla*. The Carpet weed, *Mollugo verticillata*, has come in, and does well on the open sands or along the woodland paths, its pretty whorls of smooth leaves lying on the sand, making a welcome addition to our native flora. The soil does not seem very congenial to the Umbellifers, and they are rather rare. We meet with *Pimpinella integerrima*, *Zizia aurea*, and where the ground is more generous in the supply of leaf-mold and has been long undisturbed, the *Sanicles* and *Cryptotænia Canadensis* will grow. Even the Partridgeberry, *Mitchella repens*, creeps about sometimes in the shade of trees in such spots. *Aralia hispida* is most at home of the family it represents, but the Wild Sarsaparilla is found in the richer woods, and the Spikenard is seen at times on the protected hillsides.

One of the most frequent and characteristic plants of open, sunny spots is the Prickly Pear, *Opuntia Rafinesquii*. Its clumps or beds of stems are very showy in early summer with their profusion of yellow flowers, and quite attractive in autumn when well provided with purplish fruit, which thickly studs the edges of the flattened segments, erect or curving upward when in their active stage. In similar places the small white flowers of *Euphorbia corollata* are seen very abundant and effective, because of their numbers. It often becomes a hairy plant upon the dunes. With these are associated *Eriogonum rhombipetalum*, the characteristic Evening Primrose of the sand region, though *C. biennis* is also found; the gay Butterfly-weed, *Asclepias tuberosa*, rather common, and bearing not only the usual bright orange flowers, but those that are nearly red, and the most slender of our Milkweeds, *A. verticillata*, with fine linear leaves. The Green Milkweed, *Acerates viridiflora*, finds a place, and on shrubby hillsides and in open woods

the Dogbane, *Apocynum androsaemifolium*. Of *Monarda* we have the Wild Bergamot and the Horse-mint, the latter one of the most abundant plants of the more open grounds, appearing in patches, thinly covering large areas. *Lithospermum hirtum* and *L. canescens* are found scattered everywhere, and *Phlox pilosa* is rather common.

The Toad-flax, *Linaria Canadensis*, a low annual, or more often a biennial here, shows its delicate blue flowers in May, and is associated with the Dwarf Dandelion on the hillsides. Later in the season another small annual, *Polygonella articulata*, takes a place beside it, but is more widely disseminated on the dunes, flourishing in the shade and along the sides of roads and paths. *Rumex Acetosella* has come in abundantly in such localities, and occasionally *Chenopodium Botrys*. *Comandra umbellata* appears on the sparsely wooded hills. In the dry open sands we find the Purslane family represented by *Talinum teretifolium*, with beautiful, but ephemeral, pink flowers and curious cylindrical leaves. Either seeking partial shade or by the borders of wooded areas are found some of the large *Gerardias*, with handsome foliage and showy yellow flowers—*G. pedicularia*, *flava* and *quercifolia*. The common Figwort, *Scrophularia nodosa*, var. *Marilandica*, may also be seen in the sands. Very common in the shade, especially of the Pine-clad hills, is the Cow-wheat, *Melampyrum Americanum*. In such places we come upon the *Pyrolas* and *Pipsissiwa*, *Chimophila umbellata*, and in the hollows one may occasionally see its congener, *C. maculata*. In these dry, basin-like depressions, or on the bases of the surrounding slopes, the Mayflower, *Epigaea repens*, occurs, but does not seem abundant till we come near Michigan City. *Commelina Virginica* does well on the sunny slopes, a companion of *Tephrosia* and the New Jersey Tea. *Tradescantia Virginica* is sometimes abundant, and quite frequently takes a low, hairy form. Climbing the trees or running over the bushes, with stems sometimes ten to twelve feet long, is *Smilax herbacea*. *Luzula campestris* represents the Rush family on the hills, though the ubiquitous *Juncus tenuis* creeps in beside the pathways in more favored spots. Plants that seem much out of place and serve as good examples of the strange association of species on the dunes are *Mianthemum Canadense* and *Smilacina stellata*. The two-leaved Solomon's-seal seeks cool, shaded places, and, though abundant in the deeper hollows, is not common on the hills, but the *Smilacina* is not only frequent in the shade of trees, but often very abundant on the fresh-formed high dunes near the lake-shore, where it is associated with the Sea-sand Reed and similar plants.

Space fails to speak of the Sedges which constitute the larger part of the flora of the contiguous wet lands, several species of which are represented on the ridges, or of the many cryptogamous plants which add color and variety to these sandy slopes and ridges. Of course, this list of the dune flora is not meant to be exhaustive. It is purposely limited to the higher ridges, and only those features have been kept in view that were best adapted to show its chief characteristics and varied nature.

Chicago, Ill.

E. J. Hill.

Plant Notes.

Rhododendron (*Azalea*) *Indicum obtusum album*.

AZALEA OBTUSUM, which Maximowicz, the monographer of the eastern Asiatic *Rhododendrons*, considered a variety of *Rhododendron* (*Azalea*) *Indicum*, was found by Fortune in a garden in Shanghai and introduced by him into England in 1846. It is a dwarf, much-branched shrub with slender branches, small evergreen obovate or oval leaves slightly ciliate on the margins, and from one to three-flowered clusters of small flowers, with brick-red corollas, and exserted stamens usually five in number. This plant usually proves hardy in English gardens, although it suffered at Kew during the severe winter of 1894-5, but we are unaware that it has ever been tried in the open ground in this country. The white-flowered form,

of which the photograph of a flowering branch is reproduced in our illustration on page 395 of this issue, appears to be rare and its origin is unknown to us. For more than thirty years, however, it has been growing in Professor Sargent's garden at Brookline, Massachusetts, where there are several specimens; these are planted out during the summer with the collection of Indian *Azaleas*, potted before frost, and grown in a low temperature during the autumn. With the aid of a little artificial heat the plants are in flower by Christmas, and it has been found impossible to retard their flowering until spring. The tendency of this plant to bloom early makes it possible to bring it into flower at the beginning of the year without hard forcing, and the flowers therefore last much longer than those of varieties which bloom late and require a high temperature to induce their buds to open. This *Azalea*, moreover, is a long-lived plant; its habit is compact; its light green leaves remain for two or three years on the branches; it never fails to cover itself with pure white flowers; and when white-flowered *Azaleas* are needed early in the winter it can be commended.

BEGONIA GRACILIS, var. **MARTIANA**.—This Mexican plant, usually known in gardens as *Begonia Martiana*, is well worth growing for its beauty and distinctness. Like the majority of the bulbous *Begonias*, it flowers in summer and finds its best environment under shelter, where its tall, succulent stems and delicate flowers will have protection from the elements. Strong plants have a gradually expanding stem, usually unbranched, and furnished rather sparsely with small half-heart-shaped green leaves, slightly hairy. Normally they have a single stem, but if this is checked by bending or breaking it throws off side-shoots. The flowers are borne from the axils of the leaves on short peduncles, and in good forms approach two inches in diameter. They are round, slightly cupped and of a most delicate clear pink color. As the stem lengthens it is studded at the top with flower-buds, which open in succession as it grows in height. It forms bulblets in the axils of the leaves, which may be used in propagation, and are apt to perpetuate the species in a greenhouse not too carefully kept. The round white-skinned bulbs are also less subject to decay than those of other tuberous *Begonias*, except *B. Evansiana*, which is well known as a reliable *Begonia* under very adverse conditions. Bulbs of *B. Martiana* have been found to survive in very cold wet soil in a greenhouse often just at the freezing-point, and it is barely possible that the bulblets might perpetuate the species out-of-doors, as do those of *B. Evansiana*, which is the only species yet proven hardy in northern gardens. The maintenance of *B. Evansiana* is not always, however, entirely dependent on the bulblets, as the small bulbs, at least, are usually frost-proof. How long they continue in that condition does not seem to have been observed, but it is probable that they scarcely survive beyond one or two seasons under ordinary hard conditions. Bulbs of all tuberous *Begonias* are short-lived, usually reaching the end of their usefulness in about three years. These two species are not as big-flowered as the hybrid *Begonias* which for a time seemed to every one great marvels, but they rival any of the family in dainty beauty.

Cultural Department.

An Outbreak of Asparagus Rust.

THERE has been an unusual development of rust upon *Asparagus*-plants, in some of the middle states at least, and this is so alarming to the truck-growers of New Jersey that Professor Halsted, of the Experiment Station of that state, has sent out to the newspapers a special bulletin on the subject. The directions are as valuable for those who grow *Asparagus* for home use as for those who grow it for market, and we give the essential matter of the bulletin below:

APPEARANCE OF THE FIELD.—When an *Asparagus*-field is

badly infested with the rust the general appearance is that of an unseasonable maturing of the plants. Instead of the usual healthy green color, the field has a brownish hue, as if insects had sapped the plants or frost had destroyed their vitality.

APPEARANCE OF THE PLANTS.—Rusted Asparagus-plants, when viewed closely, are found to have the skin of the stems, both large and small, lifted as if blistered, and in the ruptures of the epidermis dark brown spots are readily seen. These brown dots or lines are of various sizes and shapes, and remind the close observer of similar spots in the broken skin of stems of grains and grasses and of the leaves of Corn, also due to rusts, but not the same kind as that of the Asparagus.

NATURE OF THE RUST.—The Asparagus rust is due to a fungus (*Puccinia asparagi*, D. C.), that is, a minute plant consisting of microscopic threads which grow through the sub-

simple and effective manner by carefully gathering all the parts of the Asparagus-plants that are above ground and burning them. It would be a waste of time to stack the tops and leave them to natural decay; and to place them in manure heaps would be still worse. The only safe thing to do when a serious enemy like this is in the Asparagus-field is to burn the plants even to the last scrap that can be gathered up. Let this be done at once, for any delay means the breaking up of the brittle, rusty plants and a generous sowing of the spores upon the ground. If the fire could go over the whole field and burn all the small as well as the large pieces, that would be the best of all. This autumn burning should be done by every Asparagus grower, even if the rust is not yet seen by him. This enemy may become very serious if thorough measures are not taken at once and by all who are engaged in Asparagus culture.



Fig. 52.—Rhododendron (Azalea) Indicum obtusum album.—See page 394.

stance of the Asparagus-plant, taking up the nourishment that is needed, and finally break through the surface to bear the innumerable brown spores that give the dark color to the spots on the Asparagus skins. This is the last stage in the development of the rust fungus, and as such remains over the winter. When the warm, moist weather of spring and summer comes, the spores above mentioned germinate, and a new lot of Asparagus-plants may become infested.

TREATMENT OF INFESTED FIELDS.—There are two general methods of checking the rust, namely, by destroying the spores and by preventing their growing upon, and getting a foothold in, the substance of healthy Asparagus-plants. The rust fungi are among the most difficult to check by protecting the plants they feed upon with fungicides like Bordeaux mixture, etc., sprayed upon them during the growing season. While something may be hoped for with the spraying-pump in July and August, the chief method of eradication lies in the destruction of the spores this fall. This can be done in a very

Quality in Tomatoes.

IT is discouraging to those who are trying to improve our garden vegetables that the popularity of vegetables is much more dependent upon appearance than the quality. This is particularly noticeable in tomatoes, and the sort which pleases the eyes, even though not of best quality, is the popular variety. Many of the observers at our experiment stations seem to be influenced in the same way, and their reports would make it appear that the ideal tomato is perfectly round with no sutures, the interior made up with as many and thick partition-walls as possible, and that the fewer seeds and the less pulp they contain and the more solid the fruit, the better. Now, if one takes out a section of the interior partitions of a tomato so carefully that it receives no flavor from the pulp or exterior wall, it will be found that this is a mass of cellular matter without a particle of flavor. The flavor of a tomato is chiefly in the pulp, though there is usually a little in the exte-

rior walls. The seeds are useless for food, and the fewer and smaller they are the better. But we can have no pulp without seeds, and it is the pulp, not the partition-walls or flesh, which gives quality to the fruit. If each seed was in a cavity by itself and surrounded by pulp this would be the most favorable structure for the highest quality. Tomatoes in which the interior is broken up into many cells are desirable rather than because of the thick partition-walls or flesh. Again, it is usually the case that the thicker and more solid the pulp the better the flavor. Thin pulp is always acid and harsh in flavor.

The interior, then, of the ideal tomato should be made up of a great many cells separated by thin—not thick and fleshy—partition walls, and filled with thick pulp surrounding small seeds, only the outer walls being thick. There should be no core or hard centre, and, above all, the flavor should be a rich, mild, fruit-like acid or subacid; there is a great difference in varieties in this most important quality. Usually the skin is removed before the fruit is used, and this can be most easily done from a perfectly smooth, globular fruit. But a somewhat flattened globe or an oval-shaped fruit is far more attractive, and, if perfectly smooth, it is practically as easily prepared for use. The stem of a tomato is set in a basin, and the deeper this is the greater the likelihood of the fruit having the objectionable hard centre or core, so that in the perfect tomato it should be as shallow as possible. As to color, depth and brilliancy, evenness of distribution both on the surface and through the pulp and flesh, and its permanency in cooking, are important characteristics. The color, whether purple, deep red or yellow-red, is of itself a matter of taste. I have never seen a purple tomato in which the flavor was first-class, it always having a sharp, harsh, metallic-like acid taste far inferior to the rich fruit-like acid of the red sorts. For this reason I think the ideal tomato will be a red one.

A tomato is always at its best as to quality when it is fully ripened on the plant. It may look as well, or even better, if picked before fully ripe and ripened off the vine, but such fruit lacks in quality. To have the best canned tomatoes, fully ripe fruit should be sealed up in the cans within three hours of gathering. There is no fruit in which the highest flavor is more quickly lost, and if housekeepers will try the experiment of putting up perfectly ripe and fresh fruit of a fine-flavored variety, they will appreciate the advantage over partially ripe fruit which has been off the vines for days.

Detroit, Michigan.

Will. W. Tracy.

The Mills Grape.

AMONG the one hundred and sixty-seven varieties of Grapes in the Station vineyard here, none is more interesting than the one named Mills, and said to have been produced by crossing Muscat Hamburg and Creveling. As Creveling, though of uncertain origin, undoubtedly contains some *Vinifera* blood, this would make Mills more than half *Vinifera*, which its characters amply attest. It is distinctly tender in this climate and needs winter protection when the weather is at all severe; besides which it is an easy prey to black-rot and mildew, unless protected from them by spraying. With these precautions, however, the vine is a moderately strong grower and the foliage quite handsome.

But the most peculiar characteristics of the variety are found in the fruit. The bunches are large, compact and quite heavily shouldered; berry large, slightly oval, jet-black and covered with a thick bloom; flesh very meaty but juicy, with a sprightly flavor, and the skin so thick and tough that the bunches may be roughly handled without injury. Indeed, the skin is so tough that it is quite difficult to bite through it, and the berries adhere to the peduncle with corresponding tenacity. The seeds are large, with elongated beaks, and the chalaza near the end, as is characteristic of *Vinifera* hybrids. While it ripens soon after Concord, its season is much longer, and it will remain on the vine in the fall, protected only by a common manilla sack, until freezing weather, and is then at its best.

Although it will probably never take rank as a market sort, its peculiar characters, delightful flavor and keeping qualities should recommend it for amateur collections.

Manhattan Agricultural Exp. Station, Kansas.

F. C. Sears.

Rose Gardens for America.

IHAVE read Mr. Watson's description of Mr. Robinson's garden of Tea Roses and I agree with the editorial note that no single plant can take the place of a Rose in furnishing flowers continuously all summer long. To the question whether we can have a Rose garden like this in America I answer yes, and no.

America is a large country, and south of the Ohio and in the Pacific states there are thousands of localities where bedding Roses luxuriate, but in our northern and central states it is not every garden, by any means, that will grow Roses, though a little thought as to situation, protection and soil will often show the enthusiastic rosarian a "rose-pocket" which would have escaped the eye of the ordinary flower grower. Good drainage under a Rose bed is an absolute necessity; the soil should be a rich clay; and in our hot, dry summers a good mulch, preferably of old strawy manure, must be supplied if we would have growth and bloom; without the mulch and a free application of water, our Rose-plants will simply stand still and wait for cooler weather.

Our north-central states this year have enjoyed a summer long to be remembered; rain has fallen every few days, and it has been a delight to watch the smiling response of the flowers. Those who were fortunate enough to have planted Roses this season have been bountifully rewarded with rapid growth and an abundance of bloom, and the strong, stocky growths assure us of continuous bloom till frost.

Now, can we keep these bushes over for another year, and are they preferable to young, fresh plants? They are decidedly to be preferred to young stock, and good bedding varieties can be protected with proper care. The most perfect protection that I have ever seen used is a strip of sod set on edge in circular-wall shape about the plant, leaving an enclosure about one foot in diameter; turn the grassy side out and fill in the enclosure about the stems with loose soil. This will not injure the stems, as straw, leaves and other coverings are apt to do if the winter proves a wet one. Prune away the dead wood in the spring and you have a strong, stocky bush ready to begin work.

The hybrid Teas having a preponderance of Tea blood are the American Rose growers' surest friends, for in them we have strength and hardiness combined with perfect freedom in bloom; this will keep our matchless *La France* and its near relatives, *Augustine Guinoisseau* (white), *Duchess of Albany* (red), *Madame Veyssset* (striped), all of which are now becoming numerous, quite at the head of the list of outdoor Roses. Our experience with *Belle Siebrecht* and *Kaiserin Augusta Victoria* marks them as close followers, while *Grace Darling*, one of the finest Roses extant and showing little trace of hybrid blood, will charm every beholder. We would complete the list with pure Teas, as follows: *Papa Gontier*, *Etoile de Lyon*, *Marie Van Houtte*, *Madame Joseph Schwartz*, *Maman Cochet*, *Comtesse de Labarthe*, *Madame Welche* and *Mrs. Pierpont Morgan*, the last abundantly worthy of a trial in the garden; and all the while we are grieving for a score of other rarest beauties which any "list of twelve best bedders" must naturally exclude.

Chicago, Ill.

E. J. Hill.

Rattlesnake Plantains.

WATKIN'S GLEN is a beautiful and somewhat famous gorge situated at the head of Seneca Lake, New York. The flora in the dark and moist places is for the most part, of course, limited to a few species of Ferns and Mosses, which grow luxuriantly. After a time the eye tires of the sameness, and one longs for a bit of color to liven the sombre green. On a recent visit to the Glen, after I had become tired with the continuous climbing, I was delighted to see a tiny spray of delicate white flowers in the midst of a bed of Moss which grew on a ledge of rock at my side. A glance showed that it belonged to the Orchid family, and I carefully lifted my treasure, packed it in moss in the lunch-basket and carried it home. The next morning it was transferred, together with the moss in which it grew, to a small pot. Though this was over three weeks ago, the scape still retains its flowers nearly as fresh as when it was first found, and the buds at the end have matured. Evidently the plant is as much at home as it was in its natural state.

The little plant is one of the Rattlesnake Plantains, *Goodyera repens*, the smallest species of the three which grow wild in this region. The few small leaves cluster at the base of the plant and the scape arises from the centre of the cluster. The largest of the leaves of this specimen are not more than an inch and a half long by three-fourths of an inch broad; the upper surface is beautifully reticulated with white, and this, no doubt, gave rise to the snaky part of the common name, while the shape of the leaves at once suggests a miniature plantain. The bracted scape is about six inches long, bending slightly in a graceful curve, on one side of which the flowers are loosely arranged. The flowers are pure white, tiny almost to insignificance, yet beautiful in their simplicity. *G. pubescens* is considerably larger in all its parts, with leaves

more beautifully netted, the flowers more closely arranged on the spike and not on one side only.

These little Orchids are airy and graceful, and though not often seen in cultivation they will do well when grown in suitable quarters. From the fact that they thrive in such moist and shady places they would seem to have special merit for use in north windows and should be better known.

Geneva, N. Y.

W. P.

Ophiopogon Jaburan variegatum.—For many years after its introduction, and, indeed, even at the present time, this beautiful Japanese garden plant, in common with others, was considered tender, and always classed with greenhouse plants. There is no reason why this should be so, as far as its utility and beauty are concerned, and when once the hardness of any plant is assured, its proper place is in the garden. While the genus *Ophiopogon* is widely removed from the Grasses, nevertheless, as a margin to a bed of decorative Grasses, no more fitting plant could be used. It is perfectly hardy; more so, indeed, than some of the *Eulalias* and *Arundo donax*, which in this latitude need a good protective covering in winter. In addition to the beautiful variegation of the foliage of this *Ophiopogon*, it carries at this season a profusion of bright blue flower-spikes that are attractive in contrast with the creamy white striped foliage. This plant is often seen under the names of *O. spicatum* or *O. Japonicum*, both of which are totally different plants, and rarely, if ever, seen in gardens. The intense violet-blue flowers are typical of this variety, which may safely be considered the best in the genus. The generic name is somewhat unusual, and is a translation of the native name, which signifies serpent's beard. To propagate it, it should be lifted in spring and carefully divided. The roots have tubercles similar to *Hemerocallis*, and are easily separated; the crowns are first divided, and then the roots.

Pennisetum Ruppellianum.—A few weeks ago this new ornamental Grass was described, and its free growth from seed the first season was noted. As was promised by the introducer, the spikes are deep red-bronze, quite remarkable among Grasses that bear spikes and a striking contrast to *Pennisetum longistylum*, the better-known species, which has spikes of nearly white flowers, and the new variety has the same graceful, long, narrow, green foliage, in dense tufts, as the old form. We find it is easily raised from seed and flowers profusely the first year. In this particular it is in striking contrast with most of the annual ornamental Grasses, with the seeds of which we have had but poor success, probably because first-class seeds are not kept by dealers, owing to lack of demand on the part of cultivators.

South Lancaster, Mass.

E. O. O.

The Loganberry.—Last July I had an opportunity to taste this new berry and am exceedingly pleased with it. It has the form of a blackberry and a solid core like that fruit. The color is red and the flavor like that of a raspberry, but more acid. Eaten with sugar it is very delicious. The plant has a rambling growth and its fruiting season here extends over three months or more. Some of the berries were one and a half inches long. It is generally known that the original plant was a chance seedling of the Auginbaugh Blackberry, probably fertilized with pollen of some red Raspberry of the French type.

Strawberries.—I have for the last two seasons been experimenting on a small scale with Strawberries and am much pleased with the Arizona Everbearing. This is of good size, fair flavor and a rather light red color. The plant bears a full crop in May and moderately all the rest of the summer and autumn. It is of compact growth, forming immense stools, which appear in the distance like small hills of potatoes. In the moist atmosphere of the east the growth would probably be much stronger. I would recommend it for trial there, as possibly it might produce fruit for a longer period than ordinary varieties. Another good variety here is the Marshall. This proves a good grower, with foliage and fruit standing well up on long stems. The fruit is of good size, delicious flavor and of the brightest red color. It continues in bearing three or four months, and in favorable seasons probably longer.

Los Angeles, Cal.

E. D. S.

Caryopteris mastacanthus.—I lately saw some plants of this beautiful shrub grown from seeds imported direct from Japan. Growing alongside them were some plants purchased under the same name from nurserymen in this country, yet the two were as dissimilar as possible. The leaves of the seedlings were much larger and ovate-oblong in outline. The flowers were of a deeper blue and in larger clusters, and in full bloom

September 13th, while the other plants had hardly commenced to flower, and the leaves were lanceolate-elliptic in outline. I have known the plants sent out as *Caryopteris mastacanthus* by nurserymen almost since its introduction in this country, but I have come to suspect that some at least of the plants sent out by nurserymen are examples of *C. Mongolica*, and that I had not seen the true *C. mastacanthus* until I saw these seedlings.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

[The plants of *Caryopteris mastacanthus* in the Arnold Arboretum have been propagated by cuttings from one which originally came from Herr Max Leichtlin, and, perhaps, most of the plants in this country have been propagated in this way. Persons in doubt as to whether they have the true species can readily identify it by comparison with the figure and description in *The Botanical Magazine*.—Ed.]

Correspondence.

Notes from Santa Barbara.

To the Editor of GARDEN AND FOREST:

Sir,—*Bignonia venusta* has begun to show bloom much earlier this year, while its regular season extends from September to May, during which period the roofs of many homes are literally covered with its rich orange clusters, making a display not easily forgotten. In showiness and in vigor of growth it finds a worthy companion in *Solanum Wendlandii*, which bears in the greatest profusion its grand bunches of Wistaria-colored flowers from May to December. Another highly commendable climber proves to be the variety *Grandiflorum* of the old *Solanum Jasminoides*, producing all the year round numberless clusters of pure white Jasmine-like flowers, most useful also for cutting. Lately I happened to see a plant of this *Solanum* which had taken possession of a huge clump of *Achania malvaviscus*, the bright scarlet erect flowers and emerald-green leaves of the latter struggling to peep out of the snowy mass of their invader, a truly magnificent, although unthought for, combination.

Solanum Seaforthianum, so much advertised of late as *S. azureum*, has proved here rather below expectation, as far as freedom of blooming is concerned, while it has no right to be called azure blue. Neither can this color be claimed for the not less boomed *Caryopteris mastacanthus*, rather a pretty plant altogether, with a misty appearance, owing to its grayish green foliage and numerous whorls of pale lavender flowers. True-blue flowers are scarce, hence the tendency of floating under blue colors what honestly ought to be called shades of lavender, purple or violet color. In the line of light blues I do not know of any better than the old *Plumbago Capensis*, quite at home here and blooming splendidly in the driest places. Strange to say, the same resistance to drought is possessed by the humbler, but not less desirable *Plumbago lapentæ*, lately rebaptized as *Ceratostigma Plumbaginoides*. It is really a pity that pretty plants have to bear such fearfully long names. Quite promising and much admired, because a true blue and such a free bloomer, appears to be *Jacquemontia abutiloides*, introduced from Lower California. This is a vigorous climber; the stems and obcordate leaves thickly beset with minute silvery hair; the flowers azure blue, three-quarters of an inch in diameter, opening quite flat and standing well out of the foliage on long pedicels, generally bifurcated, each bearing twelve to fifteen flowers, two and even three of them opening at the same time, from morning till about four o'clock. This is the hour when the fluffy, pure white, sweet-scented flowers of *Calliandra portoricensis* expand every day, as if by magic, while at the same time its Mimosa-like leaves go quietly to sleep. Among newly introduced plants that have bloomed for the first time this year, *Bauhinia calpini*, from Natal, is very striking, its brick-orange flowers being produced in clusters of ten to twelve, several open at the same time, each of them two inches across, and literally covering the horizontal spreading branches. Next to this, *Bauhinia diphylla*, from India (?), has just begun to open its snowy white flowers, much larger but not as plentiful as the preceding. Several more species of the genus *Bauhinia* are likely to bloom before long; many of them are sure to prove a welcome addition to the gardens of our southern states, for their curious bilobed leaves and showy flowers having such a wide range of color.

Eriogonum giganteum, a native of Santa Catalina Island, is in full bloom, and well deserves its name, the whole plant covering not less than ten feet in diameter, each branch or inflorescence being two to three feet across, the innumerable minute

flowers white, with a slight tinge of red. It will be a fine thing to grow as an isolated specimen on a lawn, and very good also for cutting, and especially for the so-called "Mackart bouquets."

Leucophyllum Texanum is also a very valuable shrub, both for its graceful silvery foliage and pretty purple flowers, and well deserves to be spread in our gardens. Concerning color in foliage, while our native Californian trees cannot compete, to be sure, with the exuberant display of color of the eastern forests (with one exception only, and that not too desirable, the Poison Oak, *Rhus diversiloba*), what immense resources trees from abroad are going to prepare to future landscape-artists in this privileged region! A mere intuition can be had at present with the shining silver of *Leucodendron argenteum*, the rich bronze of *Croton tiglium*, the coppery tints of *Cedrela Dugesii*, of *Ficus princeps* and *F. Bengalensis*, the rose-colored new growth of *Aleurites Molluccana* and of *Bauhinia Vahlia*, the brown velvet of *Rhopala Corcovadensis* and a host of others, which are gathering here from every corner of the world.

Santa Barbara, Calif.

F. Franceschi.

American Plums.

To the Editor of GARDEN AND FOREST:

Sir,—The better varieties of American Plums in cultivation deserve more general recognition than has been heretofore accorded them. There are none of the varieties which can displace such standards of European parentage as Lombard, Bradshaw, Italian Prune and Damson, but many of them are worth growing in addition to the varieties named; and to the somewhat large class of growers with whom the European varieties are not a success, the Americana, Wild Goose and Chickasaw varieties are a valuable resource. Especially where fruit-trees are compelled to bear great inclemencies of climate the superior hardiness of American species will strongly commend them. In this section of Vermont all the varieties of the Domestica class have failed this year, only a very few well-protected Damsons and fewer Russians remaining to be excepted; but those growers here and there who have planted native varieties had heavy crops. In the orchard of Mr. L. M. Macomber, at North Ferrisburgh, I saw trees of Wolf, Wolf Seedlings, Minnesota, and also of Pottawottomie and Robinson loaded as heavily as they could possibly bear. Still larger quantities were grown by Mr. Holmes, at Shelburne, who shipped many crates to the Burlington market, where they retailed at \$2.75 and \$3.00 a bushel. With such prices as these, and with trees which bear as abundantly as most varieties of *Prunus Americana*, there could hardly be a more profitable orchard block. At Dr. Hoskins' place, which has become famous as a testing-ground for ironclads, I saw also trees of DeSoto thoroughly loaded with fruit. I should say, however, that Dr. Hoskins has also several Russian varieties of *Prunus domestica* which bore this year.

It is somewhat interesting that Chickasaw varieties, which are of southern origin, should succeed so far north as Vermont. Some of the finest plums I have seen this year were of this species. I think, in general, the table qualities of the Chickasaws are superior to those of Americana varieties, although when properly cooked, canned, preserved or made into jelly, many of them are unquestionably palatable. I have seen no plums of the Wild Goose class in this section. My recollection dwells with considerable fondness upon the plums which we used to gather along the sand-hills of the Arkansas River in western Kansas, and which probably represent Professor Sargent's *Prunus Watsoni*. Many of these fruits were very superior, I am sure. They have been quite generally cultivated locally, and a very few varieties have been named and propagated. They have never been widely distributed, however, and most horticulturists would find them a decided novelty.

Those who would discourage the planting of native Plums present the argument that they are not good for table use, and that they are not salable. Neither statement is more than partly true. Any number of good judges will testify to their culinary excellence, while the record of sales given above is a sufficient answer to the second point.

Vermont Experiment Station.

F. A. Waugh.

The Wild Flower Garden.

To the Editor of GARDEN AND FOREST:

Sir,—To a lover of wild flowers many of the cultivated forms generally found in small gardens lack something of that irresistible charm possessed by the best of their indigenous relatives, which, however, we rarely see in cultivation. There seems to be a strong desire to obtain new and rare plants from foreign countries for the sake of having that which is unusual and not possessed by every one. There is, however,

a slight, though increasing, tendency on the part of our nurserymen and plant dealers to include in their lists many of our common Ferns, flowering plants, as well as many native shrubs and trees which were never propagated for sale a few years ago.

A corner, at least, of every garden should be devoted to hardy native herbaceous plants. No flower has a more delicate grace than the nodding wild Columbine. Though its native habitat is the rocky hilltop, in sun or partial shade, it will thrive equally well in the garden. I have seen it grow and flower profusely along the north side of a building scarcely ever reached by the sun. This season I chanced to come upon a fine plant of Rue Anemone while roaming over a rocky hill. The flowers were well opened, but I took it home and gave it a place in the garden, and for nearly two weeks it was a source of great delight, being a mass of continual bloom and very attractive.

The Bird-foot Violet, *Viola pedata*, thrives well in cultivation, where it is inclined to grow much larger than in its native habitat. It is usually found only upon dry and rocky elevations where there is little soil. This may, perhaps, account for its small size. In a rich garden soil, however, one would scarcely recognize it, though still beautiful. Both leaves and blossoms are much larger, the plant frequently growing to twice or three times its ordinary height, and it is very pretty when used as an edging or grown in masses.

Ferns may be transplanted successfully at any time during the season, though probably best done in late autumn or early spring. For shady situations very attractive borders may be formed with such as the Ostrich, Cinnamon, Sensitive, Christmas, Maiden-hair and Regal Ferns. Of these the Ostrich Fern is the largest and most conspicuous.

New Haven, Conn.

W. E. Britton.

A Factory Garden.

To the Editor of GARDEN AND FOREST:

Sir,—There are not many instances in this country where the waste land adjoining a factory has been transformed into a park; usually the ground is most unattractive. An exception to this is found in the little village of Bay State, adjoining Northampton, where the proprietor of a large cutlery factory, W. W. Lee, Esq., has for several years maintained a tract of land some four or five acres in extent as a small public park. It is of easy access. A carriage-drive encircles the whole place. The open spaces are kept well mown, and large clumps of Arundos and other ornamental Grasses are used with good effect. But Mr. Lee's chief hobby is Water-lilies, and these he grows to the greatest perfection. One large circular pond is used for the tender Nymphæas. This pond is heated by a coil of steam pipes placed in the bottom of the pond, the steam being supplied from the factory. I never saw a finer specimen of the *Victoria regia* than the one he grew in this pond last year. A bed of tall-growing Cannas and Castor-oil Plants encircles this pond at a distance of ten feet, to form a wind-break, while between the bed and the pond are planted at intervals clumps of *Bambusa Metake*, *Cyperus papyrus*, *Gunnera scabra* and *Colocasia Antiquorum*.

Two other ponds are filled with hardy Lilies and Nelumbiums, one of which is situated at the bottom of a lovely dell, where flowers and Ferns grow in the greatest profusion and luxuriance. Beyond a little judicious thinning out no other attempt is made to improve this charming spot.

Mr. Lee has a unique device for keeping his Ferns and flowers moist on the banks skirting the dell. An ordinary water-pipe is laid along the top of the bank, which is perforated with holes ten inches apart, just allowing the water to trickle down the bank. The coal-sheds and other outbuildings are all screened off from view by a trellis some ten feet high, covered with *Clematis paniculata*, and a glorious sight this is when in flower, while the factory itself is covered with *Ampelopsis Veitchii*.

Two fine specimens of the Laurel-leaved Willow, planted from cuttings ten years ago, are now about twenty-five feet in height. This should be more extensively used, as it forms a well-shaped tree and its leaves are of a deep shining green, somewhat resembling a Portugal Laurel. Near the entrance to the factory are circular beds of some good herbaceous plants, each bed containing only one kind of plant. A bed of *Chrysanthemum uliginosum* was just coming into bloom, while another was gay with the scarlet flowers of *Monarda didyma*. This place is greatly appreciated, not only by the residents of the village, but by the citizens of Northampton, and, no doubt, it exerts a wholesome influence on the neighborhood.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Dipladenias.

To the Editor of GARDEN AND FOREST:

Sir,—In the account of the Boston flower show in GARDEN AND FOREST for September 16th, the Dipladenias exhibited by me were spoken of as stove climbers, but the fact is that the two plants shown had been grown in a greenhouse for five years, where the temperature was not kept above fifty degrees, Fahrenheit, with fire-heat, while it often went down to forty degrees at night. Over a dozen of these plants have been grown out-of-doors in the garden here all summer, and I have never seen foliage on any Dipladenias under glass to compare with that of these plants to-day, September 20th, for size, substance or brilliancy of color. They are so glossy that one would think the leaves had been oiled.

Whitinsville, Mass.

George McWilliam.

The Forest.

The Burma Teak Forests.—IX.

EXPERIMENTS IN PLANTING TEAK.

THERE was, however, no doubt in my mind from the outset that something more was wanted, and that it was not sufficient to protect and aid the Teak which had sprung up naturally, but that it would be necessary to increase the proportion of Teak in the forests by sowing and planting. *Tectona grandis* belongs to the family of Verbenaceæ; the ovary is four-celled, with one ovule in each cell, generally one or two only of these ovules develop into perfect seeds. The seeds are oily; they are enclosed in a nut with thick, extremely hard walls, and this nut is surrounded by a dense spongy mass consisting of innumerable forked hairs, and this mass again is enclosed in the enlarged and inflated bladder-like calyx. This remarkable structure of the Teak-seed had long attracted the attention of Burman foresters. The seed ripens early in the dry season, before the season of the annual fires sets in. My Burman friends declared that this was a wise adaptation of nature, that the seed must be roasted in the jungle fires in order to burst open its hard bony shell and to enable it to germinate. Others declared that it was quite impossible to raise Teak in plantations. Fortunately, however, Teak plantations had been established elsewhere—in Tava, at Nilambur, in Malabar, on the western coast of the peninsula, and in 1856 in Tenasserim before the forests of that province were added to my charge. The difficulties, therefore, which the foresters of Pegu had raised I put aside as imaginary, and when in June, 1857, I established my first experimental Teak plantation at Prome, on the banks of the Irraaddi River, I did not use fire to make the seeds germinate, but plenty of water, and in the exceedingly high temperature of May, up to 100 degrees, Fahrenheit, in the shade, this answered the purpose. At the time of germination the expanding embryo bursts open the hard shell, and a piece of the outer wall comes off bodily like a round concave cap. Teak seed, however, has this peculiarity, in common with the European Ash, *Fraxinus excelsior*, that the seed does not germinate evenly. The seedlings continue coming up successively for a considerable period, numerous seedlings not appearing until the second or third year, and a portion not germinating at all. This irregularity had possibly given rise to the opinion that Teak could not be raised artificially. Teak, like Oak, has a long tap-root when young; the root is soft, and seedlings are most sensitive to any injury to their roots. The best plan, therefore, is to raise seedlings in nurseries before the commencement of the rains, and early in the rains to plant them out when they are four to six weeks old.

PLANTATIONS MADE IN THE OPEN COUNTRY.

The Teak plantations succeeded well; the difficulty was the expense. The greatest outlay was the clearing of the dense tropical forest; another was to weed the ground after planting, so as to prevent the small Teak-plants being smothered by the luxuriant growth of weeds and coppice-shoots which, during the rains in this forcing tropical climate, spring up in profusion and smother the young Teak. Attempts were made to establish plantations on a large scale in the open country outside the forests, a plan at first sight excellent, because the open country is less feverish than the forests, labor consequently procurable at all seasons and much less expensive; because thinnings will sell and the mature timber raised in these plantations may be brought to market at less expense. The results, however, of these operations in the open country have not proved satisfactory. The growth of trees is the result of numerous factors, some of which are not yet fully under-

stood. The market value of a Teak-tree, to a great extent, consists in the regular cylindrical shape of the log, which ought to be without knots and other irregularities. Teak-trees grown in gardens near Calcutta and in the open country of Burma invariably have fluted and irregularly shaped stems, and show a much greater tendency to crooked and irregular growth than trees grown up in the heart of the forests. Hence, plantations in the open country outside the forests have not been extended largely. Their area is sufficient to ascertain by actual experience whether by allowing the tree to grow up in dense compact masses and by careful thinnings, removing all spreading and otherwise badly shaped trees, Teak can be made to produce first-class timber in the comparatively dry air of the open country.

KAREN HILL CLEARINGS.

Hence, the question to be solved was to arrange planting work in the forests here, always to command the necessary labor and to reduce expense. This question was solved by raising Teak with the aid of field crops. The inhabitants of these forests mostly belong to different tribes of the Karen nation, mentioned in the first of these papers. In places they have in the valleys of these hills permanent gardens of Oranges, Mangoes and other fruit-trees, groves of the Betel Palm, Areca Catechu, and plantations of the Betel Vine, Piper Bette, all carefully watered by channels taken off from the mountain streams. The grain which they cultivate is Rice, and this, together with Pumpkins and other vegetables, as well as Cotton, they raise by a rude system of shifting cultivation. These Karens live under a patriarchal government in small villages, each village under a head man called Tookay. On the area fixed upon by the Tookay for this year's clearance the forest is cut down early in the dry season, in January or February. By that time the dew has ceased, every day the air gets drier and the sun more fierce. The tangled mass of Bamboos and branches gradually becomes dry like tinder; toward the end of the hot season, in April, it is fired, and the results are heaps of white ashes among the black-charred trunks and stumps of the larger trees which the fire has not consumed. After the first showers in May the paddy is sown in shallow holes made with a narrow spade. The heat is great, the rain copious and the Rice germinates rapidly. But weeds and the coppice-shoots of stumps not killed by the fire also profit by heat and moisture; they grow up with alarming luxuriance, and threaten to kill the young crop of Rice. Hence, all the women and children of the village in long rows are hard at work weeding the toungya, or hill-field, for thus it is called in Burma. Thus the bright emerald-green Rice-fields on the slopes of these hills, cleaned and kept clean by dint of enormous labor continued throughout the season, form a pleasing contrast to the varied, but darker, foliage of the surrounding forest. In October, and sometimes in September, breaks occur in the rains, the ears are formed, and the crop is harvested in December.

TOUNGYA TEAK PLANTATIONS.

As soon as I had seen the first Karen toungya in 1856, I determined to devise some method by which this mode of shifting cultivation might be utilized for planting Teak on a large scale in those regions where this species attains its most perfect development. A Burman forester, Moug Tsadoon, who was in charge of the Raboung forest district, to whom I had explained my wishes, was the first to carry out the plan. On a subsequent visit, in 1868, I had the satisfaction to examine six small plantations made by him on toungyas in successive years, the oldest in 1856. On this small plantation, then twelve years old, the trees were from fifty-five to sixty feet high. Upon a really large scale toungya Teak plantations, however, were not established until many years later. It was Major (now Major General) Seaton, an officer in one of the Madras regiments, at that time stationed at Rangoon, whom I had, together with other military officers, engaged for service in the forests. In 1868, when he had gradually risen to be Conservator of Forests, and had succeeded in gaining the confidence of the Karens in several forest districts, he induced them to plant Teak with paddy on their hill clearings, certain rates being paid for each acre with a stipulated number of plants a year old. In 1880 an aggregate area of 2,515 acres had thus been planted up at a total cost of 24,932 rupees, or less than ten rupees an acre. Under these arrangements the clearing of the forest and the weeding of the plantation during the first year was accomplished at exceedingly moderate rates. The principle of planting Teak on the same area with field crops was adopted in the case of plantations made by means of hired labor, called regular plantations, in order to reduce the cost of these undertakings; nevertheless, the expense per

acre was always six to eight times that of toungya Teak plantations made by the Karens in the forests. *Dietrich Brandis.*
Bonn, Germany.

Notes.

The green fruits of *Nasturtiums* (*Tropæolum*), valued for pickling, now cost fifty cents a quart in our markets.

One of the most interesting exhibits at the Florists' Convention in Cleveland was a collection of hardy Phloxes shown by The Storrs Harrison Company, of Painesville, Ohio. During the past three or four years the improvement in these plants has been as great as in any other class of perennials, and now in variety, in the length of time through which they bloom, and in their varied and delicate beauty they leave very little to be desired.

The name of the donor of the new range of greenhouses recently completed for the Department of Botany of Smith College has up to the present not been announced. Last week, however, a bronze tablet placed at the entrance of the Palm-house bears this inscription: "The Lyman Plant House. A Memorial Tribute to Anne Jean Lyman, by her Son, Edward Hutchinson Robbins Lyman." It is a noble gift appropriately dedicated to a useful service.

A correspondent of *The Rural New Yorker* writes that the ordinary annual garden Coreopsis, or, as seedsmen call it, Calliopsis, makes an admirable window plant. In the early autumn seedlings come up abundantly where these plants are grown, and some thrifty ones are taken up, potted and kept in the ordinary way and brought in before frost. Under good conditions these plants will begin to flower in a sunny window about the middle of January and continue for many weeks.

At the first annual exhibition of the American Dahlia Society in Philadelphia last week there were more than five hundred vases on exhibition, many of them containing twenty-five blooms of the kind. Mr. W. P. Peacock, of Atco, New Jersey, the well-known specialist, received twelve first prizes; Mr. W. H. Maule received first prize for the best novelty, a pink flower called La France; and other large collections were shown by Mr. A. Blanc, W. Atlee Burpee and H. G. Faust and Cornell University, which sent a collection of 225 varieties.

In some notes on growing Radishes under glass in *American Gardening*, Professor B. T. Galloway states that in order to have all the roots attain marketable size at the same time it is essential to use only the larger seed. For this purpose the ordinary commercial seed is screened through a sieve made of a sheet of brass perforated with holes 8-100ths of an inch in diameter and placed about one-sixteenth of an inch apart. Less than two-thirds of the seed will remain in the sieve, but ninety per cent. of these will germinate and the entire crop will attain edible size at about the same time.

In connection with the horticultural display of the exhibition of the American Institute, which opened on Monday in Madison Square Garden, the Dahlia Society will hold a conference on October 6th, when Rev. C. W. Bolton and Lawrence K. Peacock, secretary of the society, will make addresses; on October 9th successful cultivators will give their experience in the growing of fruits; vacant lot farming will be discussed by Mr. Kelgaard on the 13th, and there will be exhibits by the growers; on the 16th the subject of addresses will be the relation of woman to floriculture. These meetings will all be held in the reception room which adjoins Concert Hall, where the floral exhibition will be located.

The first chestnuts to reach this city in any considerable quantity came from the Alleghany Mountains, near Oakland, Maryland, a week ago, and sold at wholesale for \$10.00 a bushel. Larger and better-colored chestnuts have since been received from the Wallkill Valley in this state, the first lots commanding \$9.50, and later shipments \$8.00 a bushel. The crop in West Virginia and Tennessee is said to be very heavy, and, indeed, Chestnut-trees are generally loaded with nuts, so that these high prices will not be maintained. The first hickory-nuts are now on their way to the wholesale merchants, and low prices are anticipated from the start on account of reports of a large supply. In some sections, however, as in northern New Jersey, for example, we have observed that the Hickories are bearing very few nuts.

As the days become cooler many plants in the herbaceous border which flower in early spring have the good habit of blooming through another period. Among the most noteworthy of these are the Globe-flowers, or *Trollius*, both *T. Asiaticus* and *T. Europeus*, which are now showing their beautiful orange and yellow flowers almost as profusely as they

did in early spring. The sweet-scented and delicate *Daphne Cneorum*, a prostrate little shrub which does not like the hot weather of our summers, blooms a second time as soon as the nights become cool and the days short. Some of the Iceland and Alpine Poppies do the same thing, and they are beautiful at whatever season they are seen. These plants, like the hardy autumn flowers, will not turn black at the first frost, but will keep on blooming long after the *Coleus*, *Alternanthera* and other so-called bedding plants are entirely killed.

An unusual offering on last Saturday, for this time of year, was strawberries, said to be second-crop fruit, from southern New Jersey. These sold for \$1.25 a quart. Huckleberries have been in continuous supply since the middle of May, when the first came from North Carolina; those now coming from the mountains of New York cost fifteen cents a quart. Large perfectly grown quinces may be had for \$1.00 a half-bushel. Oranges, from Jamaica, are of fair quality for early fruit, and their tartness is quite acceptable after the rather insipid Mediterranean summer oranges. The main dependence for this fruit will be upon Jamaica during the next two months, since but little of the limited Florida crop will leave that state, and the early shipments from California are not due here before the middle of December. European hot-house grapes are now coming to this country from large commercial graperies near Liverpool, and are arriving in exceptionally good order.

A case at law of importance to buyers and sellers of Orchids was decided in August in a court of the city of London. The plaintiff bought at the auction sale of a well-known collector several choice and valuable species and varieties, some of which proved untrue to name and of little value, and not feeling disposed to stand by such a bargain, he made application that the high prices paid should be refunded. As the request was refused the plaintiff brought action to recover his rights. Two well-known experts testified that they had seen the plants in flower, and they were not true, and another bore witness that no variety of Orchid would alter its character by changing into another variety, and on this testimony the plaintiff received a verdict with costs. The Orchids in question were the white form of *Cattleya Skinneri*, which proved to be only the ordinary colored form; *Odontoglossum* \times *elegans*, which turned out a pure form of *O. Hallii*, and *Dendrobium* \times *splendidissimum grandiflorum*, said to be *D. x Leechianum*.

A correspondent of *The Country Gentleman*, after stating the well-known fact that farm products now sell for little more than the labor they cost, and that, therefore, the farmer cannot afford to pay another profit on anything that can be produced at home, inquires why so much that is bought at the village store is found on the farmer's table and so little of what he might raise on his own acres. Why, for example, should not ripe strawberries always be had in abundance in their season when they can be grown as cheaply as potatoes, bushel for bushel; and why should not raspberries be found with blackberries, grapes and all the choicer vegetables which are wholesome, and certainly cheaper than the canned goods which he buys so freely? The true reply is not that farmers are indolent and not that they lack the space, but that they do not know how to grow fruit and fine vegetables. If they would look upon the garden less in the light of a luxury, and esteem it as the most profitable portion of their farm, and then give as much thought and attention to it as they do to what seems larger affairs, there might be less complaints of hard times and ill health.

The demand for American hardwoods in Europe is growing, and oak leads the foreign shipments, although tulip poplar, ash, gum and black walnut, whenever a good quality can be secured, are in some demand. European consumers like the quality of American oak, and since it is known to be plentiful here it will probably be in increasing demand. Cottonwood has been shipped to Germany in considerable quantities, where cheap wood is required for furniture and other uses. Much of this lumber is forwarded from New Orleans, and since a great part of the oak, ash, poplar, cottonwood and other timbers demanded by the foreign market is in the southern states, it is not improbable that lumber for foreign markets will be largely shipped in future from the Gulf ports. In speaking of this matter *The Northwestern Lumberman* says that the European market requires lumber cut of exact thickness, and of accurate length, trimmed so as to have the butts square and true. Space for piling in the yards of the Old World is an object, so that random, uneven lengths are objectionable, and since the foreign buyer insists that he shall have just what he bargains for, quality should be strictly attended to.

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The Conservation of Moisture in the Soil.

ONE of the best-known facts in vegetable physiology is that living plants are made up largely of water, and that cultivated crops need an enormous amount of it for their development. Succulent fruits and vegetables, like Melons, Lettuce and Asparagus, when analyzed show as much as ninety-five per cent. of water. Root crops, like Beets and Carrots, may contain as much as ninety per cent. Grass and grain contain more than eighty per cent., and when at the blossoming stage as much as seventy per cent., and even the mature leaves of trees, and often the entire trees, are considerably more than half water. Of course, the cells and cell-walls of living plants must be kept in this moist, half-liquid condition to carry on their life processes, and since the water which is continually transpired through the leaves must be steadily replaced by fresh supplies drawn up through the roots, a plant in the course of its growth must take up many times its weight of water from the soil. Experiments in Prussia have demonstrated that for every ton of dry matter in an average crop of barley the plants exhale during their growth 310 tons of water; at the Cornell Experiment Station one ton of dry matter in a crop of oats represented an expenditure of 522 tons of water, and about the same proportion was needed in Wisconsin, according to observations in the experiment station of that state. In all these cases it is probable that better crops would have required more water, and since many different investigations have shown that the rain which falls upon a crop during its growth is not sufficient to support it, one can readily realize the importance of securing as much as possible of what falls during the entire year and of preserving it for use when the plants need it. When it is remembered, too, that all the ash ingredients—that is, the matter left after combustion—as well as other important elements, are taken up in a highly diluted form by the roots, which means that the fertility of the soil depends largely upon moisture, the furnishing of crops with the proper amount of water at the proper time may be considered as the fundamental problem of agriculture and horticulture.

Where irrigation is not habitually practiced, as is the case in most regions which are not classed as arid, it would

seem that the first essential of successful tillage would be to prepare the soil to receive and hold as much water as possible. This means in many cases deep plowing, in all cases thorough pulverization of the soil and not a mere turning over of the surface. In his book on *The Soil*, Professor King says: "Since each independent grain of a moist soil is more or less completely surrounded by a film of water it is evident that the largest aggregate surface area may retain the most water per cubic foot. Now, a cubic foot of marbles one inch in diameter possesses an aggregate surface of 37.4 square feet, while if the marbles were reduced in diameter to one-thousandth of an inch, the total area per cubic foot is increased to 37,700 square feet," which means that a lumpy soil with large particles will absorb much less water than if it were made fine, and it means also that its power of retaining the moisture is reduced as well as its power of absorbing it. The breaking up of the soil and subsoil in autumn is therefore indicated as a means of checking the loss of water during the winter and spring by the drainage over the surface of rains and melted snows. When the soil is in good mechanical condition, if a crop is kept growing on it in the winter, the plants help to bind it and save the soluble plant-food which can be turned under in the spring. This also increases the humus in the soil, which adds to its capacity for holding water, besides supplying a storehouse for nitrogen.

But after all possible water is collected the problem of preserving it still remains. A soil which is in the best condition to hold the water which falls from the clouds is also in condition to draw up by capillary movement the stores of water from the deep permanent supplies of ground-water. Professor Johnson has illustrated the need of a soil made mellow and porous by tillage by comparing it with the strands of a wick in a lamp which neither fit too tightly nor too loosely in the socket; in other words, there is a certain degree of porosity which lifts the most water from below to supply what is exhaled by plants or evaporated from the surface. Some kind of mulching is essential to check this evaporation, and, as we have often explained (see, for example, vol. vi., pages 281, 411), shallow tillage acts as a mulch and is the most practicable way of providing it. Some interesting experiments which have been made by Professor Card in the University of Nebraska show that a mulch of coarse manure is better than surface tillage, but this is too expensive to use on a large scale. His experiments also showed that lightly stirred soil provided a mulch which was nearly as effective. The accepted theory is, that the water which is drawn by capillary attraction through a compact, though porous, soil to the surface evaporates there and passes away, while if this surface is broken and thoroughly worked to a depth of a couple of inches, the continuous pores are interrupted and the loosened earth, spread like a blanket over the compacted soil below, checks the rise of moisture and its dissipation in vapor. The result is that the water which would otherwise be wasted is put to use. Since its escape from the surface is prevented, it is forced to pass through the plant and do its work before it is transpired from the leaves. This is not an unsupported theory, and we have, time and again, quoted the experience of farmers, horticulturists and fruit growers (see, for example, vol. vii., page 56) to show that fruit and garden crops keep on growing through a drought under shallow tillage when uncultivated crops are at a standstill.

Now, there is nothing new in all this, and yet every year thousands of dollars are lost by neglecting these plain teachings. Of course, besides the considerations we have mentioned, there are others to be taken into account, such as underdraining, tree belts to check the sweep of drying winds, etc., but tillage is the prime factor, and we endorse thoroughly the conclusion of a bulletin lately issued by the Cornell Experiment Station, in which Mr. L. A. Clinton, the Assistant Agriculturist, says: "The importance of thorough tillage to conserve moisture cannot be made too emphatic. Deficiency in rainfall, with intensified agricul-

ture, is preferable to abundant rains and neglect by the cultivator. The soil will respond in a large measure according to the treatment it receives. Neglect it, and it will fail to bring forth liberal increase, but cultivate intelligently and thoroughly, and it responds quickly." The bulletin to which we allude is entitled "The Moisture of the Soil and its Conservation," and the whole subject is treated in a concise, but satisfactory, way. It is stated, to begin with, that the average rainfall during the year in New York is sufficient for the growth of crops, but, owing to its unequal distribution through the year, nearly one-half of it is lost by surface drainage, and crops usually suffer from drought. How to use the plow and the harrow, the cultivator and the roller so as to prepare the soil to receive and enable it to retain the moisture needed for the feeding and upbuilding of crops is made clear, and farmers are instructed how to sample the soil and determine the amount of moisture at different depths, and in this way to ascertain for themselves, by comparison between cultivated and uncultivated land, how much they can add to the producing power of their farms. We can think of no more interesting and instructive tests than these, not only for the individual farmer, but for granges and horticultural societies. Hardly a year passes in which some crop, early or late, is not diminished by drought to one-half, one-quarter, or a still smaller fraction of what it should have been. No matter how rich the soil, how pure the seed, or how careful the initial preparations have been made, a deficiency of moisture means failure and loss. How the farmer and gardener can have a reasonable assurance against a great deal of this loss has rarely been set forth more succinctly and clearly than in this bulletin, No. 120, and we commend it to the study of every progressive cultivator.

Roadsides in Autumn.

THE singular beauty of the wild growth that takes possession of undisturbed waysides makes one of the great pleasures of driving in the hill towns and more out-of-the-way portions of this and every country region. These roadsides are in many cases steep banks of considerable height; in others they are rough, rocky or wet; but Nature, by her inexhaustible magic, drapes and garnishes them with a lavish and ever-changeable grace and splendor. When the road-makers, in a spasm of zeal for "cleaning up," cut and slash along the highway, reducing this tangle of loveliness to heaps of slowly withering "brush" and a scarred and stony bed, it is enough to bring tears to the eyes of the discerning. In the spring or early summer this is not an infrequent catastrophe along the course of some favorite drives. But in the autumn, even those borders where devastation was wrought in spring have become beautiful again. Already they are softly clad in a wide mantle rich with Golden-rod, Asters and innumerable clumps of green or blanching Ferns.

But it is the fortunate by-roads that remained unmolested which now ripen their free harvests of intense color. Festooned from tree to tree, or hanging in massive luxuriance upon natural arbors of woody thickets, the wild Grape has ripened its abundant clusters; here they hang, dark in the shade and lucent in the sun, red and purple-black and greenish, opaline white. The Stag-horn Sumach, always picturesque and vigorous in form and expression, is now at its culmination of color, a splendid object. Not its crimson velvet horns alone, but the whole shrub brightens the wayside copse like a blaze, for there is no early autumn color in the whole breadth of the woodlands more vivid than these flame-like leaflets, in which the color has all the subtle play of that which lights the hearth in the autumnal twilight. If we are tempted by the greed of possession, it is easy to gather an armful of the long, decorative compound leaves, in which every one is a study and each unlike all the rest. But they soon curl and lose their beauty in the house; they belong to the brilliant, bracing

air of the wayside. Other spoils there are, less perishable, which lend to indoor walls a certain sumptuous, yet sober, adornment, worthy of the season. Such is the Bitter-sweet, its bright scarlet fruits now beginning to gleam within the parted orange calyx. The woody vine in its complicated involutions often becomes a marvel of web-like, yet solid, structure, and makes a noble piece of decoration, mounted with all its clusters in its native order. The feathery seed-puffs of the white Clematis combine with it harmoniously, and these two are among the best home adornments to be ravished from the wayside copses. Another bright berry that makes gay the moist places just now is the Black Alder, or Winterberry, our best northern substitute for the Holly. Its bright red berries are quite permanent when dried in the house, and sure to justify one of its local names—the Christmas-berry. The common Barberry, too, is now a jeweled bush in favored localities in the Connecticut valley, where it is as much at home as any native shrub. Its thickly hung, drooping racemes of bright fruit hold tenaciously to the stem, and make a charming ornament, even when somewhat wrinkled and spent.

Nor is it the grand masses alone, or even chiefly, with which Nature feels our joy in her, but the ever-changing mystery and surprise of her wonderful and exquisite variety. All the splendor of autumn rests upon some modest bit of perfection that meets the eye with an unexpected charm; it may be only

The creamy elder mellowed into wine,
The russet hip that was the pink-white rose.

Even the lowly carpet of her most secluded haunts is enameled with the Partridge-berry and the fruit of the Wintergreen, the richest scarlet against the deepest green. Everywhere a splendor set in harmony with that inimitable grace and fitness which is at once the highest teaching and the despair of our puny gardening. No artist-planned and labor-cultured plantations and shrubberies can rival the splendid simplicity of Nature on her own domain.

Along the by-roads the quaint, ruffled husks of the hazelnuts are now parted to show the ripe, brown nut within. The bushes abound along these Hampshire County hillsides, and the harvest they bear is heavy enough to be hardly less precious to the squirrel than are the chestnuts, which now begin to drop from their burrs. The Hazel takes on a rich, tawny olive at this season, one of those fine ground colors upon which the thousand brighter dyes are so effectively displayed. A few weeks more and the bright golden flowers of that distant cousin, the Witch-hazel, will be left to shine alone, almost the sole witness to Nature's splendor, amid the brown and leafless thickets.

Amherst, Mass.

D. H. R. Goodale.

Product of White Pine per Acre.

IN criticising certain statements of mine, Mr. B. E. Fernow says (see GARDEN AND FOREST, page 202 of the current volume): "One of the elements that needs to be known in order to discuss the profitability of forestry is the amount of useful wood which can be produced per acre. On this point the most erroneous and extravagant notions exist, and many calculations are made on paper which can never be realized. The rate of growth of a tree at a given age is supposed to continue indefinitely, and this rate is applied to an acre of trees, . . . and thus we can compute astonishing yields for the future."

To this statement I fully agree, and, as a practical manufacturer of lumber, I have little patience with persons without any practical knowledge of manufacturing lumber, who measure a few trees, or employ agents to do so, figure out on paper the results of their measurements, and then rush into print with their figures to controvert the statements of men who have cut many measured acres of trees, who have had the logs measured, sawed into boards, the boards surveyed, and then make an accurate report of their experience.

For many years I was engaged in buying large quantities of Pine-trees, and, as was the custom at that time, I bought them on the stump, in many cases by the acre. It was my practice to hire the logs drawn to the mill by the cord of 128 cubic

feet; each load was measured by a surveyor; thus I was able to get at positive results not confined to a single measurement, but of numerous measurements.

It may be of some interest to Mr. Fernow to know that 128 cubic feet of logs, measuring from seven to fifteen inches in diameter (a fair proportion of each as they usually average), will make 1,000 feet of five-eighth-inch box-boards (surface measurement), and that I have frequently got 60,000 feet from an acre of land, the trees being not over thirty-five years old.

Mr. Charles H. Dwelley, of Hanover, Massachusetts, who for many years was engaged in buying Pine-trees by the acre, and having the logs and boards surveyed in the same way as was my custom, writes me, in acknowledging the reception of my paper, that I have understated the growth per acre, but he agrees with me on the amount required to make 1,000 feet of box-boards, for he stated that it would take 128 cubic feet of logs seven to fifteen inches in diameter to make 1,000 of box-boards. Mr. Dwelley also stated that he cut from two measured acres enough logs of fifty years' growth to make 200,000 feet of box-boards.

The measurements of trees which I made recently were to satisfy myself as to the number of trees that could be grown on an acre, if there were no open spaces, and learn their diameter at two feet from the ground when thirty-five years old; it was not for the purpose of ascertaining what naturally grows on an acre.

It is fair to presume that Mr. Fernow has had large experience in cutting and sawing lumber. His work may have been in that portion of this or some other country where lumber on the stump was of but little value, and where sawmills were constructed for speed rather than for economy, as they are in Plymouth County, Massachusetts. A very large circular saw, with teeth set by one who has no thought of economy, would, no doubt, waste in sawdust enough to bring the quantity of lumber, per cubic foot, down to Mr. Fernow's statement. It should be remembered that my statements were confined to Massachusetts, and particularly to Plymouth County, where I find Pine timber grows very rapidly.

Having had a sawmill in Franklin County, Massachusetts, and having sawed Pine-trees into lumber from many acres there, I found that the growth was very much less per acre, and not nearly as rapid, judging from the growth of the sections between the links. While Pines in Plymouth County frequently grow three feet in a year, those I cut in Franklin County rarely showed a growth of more than eighteen inches. As I worked only two seasons in Franklin County I do not feel that I know enough about the average quantity of lumber per acre, or the age for cutting it, to make any positive statements; but my impression is that sixty years would not secure a larger growth there than might be obtained in thirty-five years in Plymouth County.

It must be evident to every observing person who has traveled much, that the growth of the White Pine varies in different sections of our country so much that he who attempts to get an accurate average of the whole country will find that he has undertaken an impossible task. By cutting the trees on a measured acre, sawing them into boards and measuring the boards, we know the exact product of the acre, but we can get no positive knowledge of what an acre of standing trees will produce by any measurements we may make.

Hingham, Mass.

Edmund Hersey.

Foreign Correspondence.

London Letter.

GLADIOLUS NANCEIANUS.—This comparatively new race is attracting considerable attention among English cultivators, several of whom have taken up their cultivation and improvement with excellent results. Messrs. Veitch lately exhibited and obtained certificates for a batch of new varieties which were remarkable for the large size and extraordinary coloration of the flowers. I believe this and *Gladiolus Childsii* are practically the same; at any rate, they had, according to Herr Max Leichtlin, the raiser of both, the same origin, namely, a cross between *G. Saundersii* and some of the varieties of *G. Lemoinei*. The flowers of some of the most recent seedlings are six inches across, and in color some of them verge on blue or violet. I have not heard much of *G. Childsii* lately, but I know that a year or two ago an American wholesale bulb grower took this race in hand and intended to grow large quanti-

ties of the best varieties. English horticulturists are planting them largely, thanks chiefly to Monsieur Lemoine, of Nancy, who holds a large stock of the best varieties.

CYRTANTHUS HYBRIDUS.—This beautiful greenhouse plant was raised in the garden of Sir Trevor Lawrence in 1885 from *Cyrtanthus sanguineus* (*Gastronema*) and *Vallota purpurea*. It is not yet sufficiently plentiful to be well known, but it is a plant which is certain to find general favor, as, while possessing quite as much beauty as either of its parents, it is easy to cultivate. A single bulb planted three years ago in a shallow border close to the glass in a sunny greenhouse has yielded a dozen or so good flowering bulbs, which, grown in four-inch pots in a light frame, have flowered freely. The flowers are intermediate in shape between those of the *Vallota* and the *Cyrtanthus*, while in color they are pale scarlet. The *Vallota* is also flowering now. When properly grown this is a superb greenhouse plant, but it often disappoints cultivators by failing to flower. A thorough baking on a shelf in a sunny greenhouse during June, July and August is essential to its blooming. The white variety, of which we heard so much a year or two ago, turns out to be a pale, washy, red-flowered form, far less attractive than the type.

ACIDANTHERA BICOLOR.—A first-class certificate was awarded to this plant last week by the Royal Horticultural Society, presumably because of its rarity, although it has been grown in the Cape house at Kew for the last six years and in gardens about New York (*GARDEN AND FOREST*, vol. i., p. 84) even longer. For the past month a bed of it in the open air at Kew has been gay with flowers, proving that under the same treatment as *Gladioli* it is a success. Grown in the mass it is really effective when in flower. In a bed close by is a batch of the newer *Acidantha œquinotialis*, introduced to Kew from Sierra Leone three years ago, and flowered in a greenhouse in December. Out-of-doors it is not a success, the growths being only half-finished by the middle of September, even in such a favorable summer as the past has been. It may be called a large edition of *A. bicolor*, the leaves being two feet long and two inches wide, the spike three and a half feet long and the flowers half as large again as those of *A. bicolor*; in color there is no appreciable difference between them. [*Acidantha bicolor* thrives here also when grown out-of-doors in the same way as the ordinary garden forms of *Gladiolus*. Mr. Gerard lately brought to this office some of these flowers which were grown in this way. In grace of habit, purity of color and delightful fragrance they have few superiors.—ED.]

BRUNSVIGIA.—Only two of the ten species of this genus are known in cultivation, and these are both in flower now in the Cape house at Kew. They are *Brunsvigia Josephinæ*, which has a bulb six inches in diameter, leafless at the time of flowering, a scape eighteen inches long and a spreading candelabra-like umbel of flowers two feet through, the flowers three inches long, with reflexed, unequal segments colored bright brick-red. The second is *B. gigantea*, which has a scape a foot long, reddish flower-stalks as long as those of *B. Josephinæ*, the flowers smaller, paler in color and not so numerous. These plants grow in arid plains in south Africa, their bulbs buried often a foot below the surface, so that the umbels of flowers appear to rest upon the ground. Under cultivation, however, they require to be potted, so that the bulb is exposed to the ripening influence of sunlight and air, otherwise they will not flower. They should be kept in a sunny greenhouse or frame till the leaves fade, usually in May, and then exposure to sunlight and drought is essential till the flower-spike shows, which should occur in August.

HYMENOCALLIS MACROSTEPHANA.—Plants of this noble tropical bulb have been flowering freely this autumn in the Palm-house at Kew, where they thrive planted out in a border in a sunny position. It is as fine a plant in every way as its supposed parent, *Hymenocallis speciosa*, being quite as easily accommodated, growing rapidly and forming large tufts of strap-shaped leaves three feet long, and

producing annually sturdy scapes bearing large umbels of white flowers. These have a tube three inches long, elegantly curved segments of the same length, and a funnel-shaped cup two inches wide and long. They remain fresh several weeks and emit a powerful and delicious odor. The origin of this plant is obscure. It was first described in 1879 by Mr. Baker from plants grown in the Duke of Northumberland's garden at Syon House, where it is still grown in quantity for the supply of cut flowers. Mr. Baker surmises that it is the hybrid between *H. speciosa* and *H. (Ismene) calathina*, known to Dean Herbert early in the century.

CRINUM MOOREI and *AGAPANTHUS UMBELLATUS* are two of the most useful plants for the conservatory that we owe to the Cape. They are alike in their good-natured behavior under ordinary cultivation, forming large masses if grown on, and filling in a few years the largest pots or tubs. They do not object to being cramped at the root if supplied with manure-water when in growth, and they may be grown in cold latitudes in gardens where there is no glass accommodation, if placed in the open air during the summer and wintered in a dry shed. For placing in conspicuous positions on terraces or lawns or in corners where flowers are wanted to combine with architecture or statuary for summer effect they are of the greatest value. The *Agapanthus* is frequently grown for such purposes, but the *Crinum* is scarcely known in this character. Of course, large specimens are needed, but once obtained they are not easily lost. This year they have been exceptionally good with us, but I have been surprised by the number of inquiries as to the name and history of the *Crinum*.

WATSONIA IRIDIFOLIA ARDERNEL.—Messrs. R. Wallace & Co., Colchester, have exhibited this plant at several flower shows lately, and it has won general admiration on account of its tall stems and large, numerous pure white flowers. Apparently it is identical with the white *Watsonia* introduced in 1889 by Mr. J. O'Brien and described by Mr. N. E. Brown as *W. iridifolia* O'Brieni. This plant has been grown annually out-of-doors at Kew since that time, where, in a bed in a sunny position, and when treated like *Gladioli*, it develops branched spikes three or four feet high bearing numerous flowers with a tube two inches long and a spreading regular limb of oblong segments nearly an inch long. The plant, however, appears to have failed to attract the attention of horticulturists until now. Messrs. Wallace offer the bulbs of it at thirty-six shillings a dozen and describe and prescribe for it as follows:

This grand new bulbous plant, which in habit much resembles a *Gladiolus*, throws up strong branching flower-stems three to four feet high, carrying from fifty to one hundred flowers, which are of the purest white and of fine size and shape, much resembling a gigantic white *Freesia*. It is a lovely plant, and one we have every confidence in recommending. It is best started in a greenhouse in April and then planted out in June, though in warm districts it may be planted outside, or may be treated as a greenhouse plant entirely. After flowering, the bulbs should be lifted, thoroughly rested and dried off and kept free from frost.

London.

W. Watson.

New or Little-known Plants.

Diervilla Japonica.

DURING a journey which I made in northern and central Japan in the summer and autumn of 1892 I tried to obtain some information of the wild types of *Diervilla* from which the numerous garden forms are derived, gathering specimens and seeds of the wild plants I encountered from the Hakone Mountains, on the south, to Sapparo, in the island of Yezo, at the north. Plants raised from these seeds have flowered this summer in the Arnold Arboretum, and the illustration of the flowering branch, on page 405 of this issue, is made from one of these plants. The fruiting branch is from a wild plant.

In central and northern Japan, *Diervilla* is a common shrub on the borders of mountain woods and by the banks

of mountain streams, where it frequently grows fifteen feet high and from ten to twenty feet through, with numerous stout branches. It has ovate, acute or acuminate leaves, which are nearly glabrous, with the exception of a few hairs on the lower surface of the midribs and veins, or on some individuals these are clothed more or less thickly with soft pale pubescence. The flowers are borne in few or many-flowered clusters, which are long-stalked, or nearly sessile, the two forms appearing on the same plant, and they are rose-color, pale yellow, dark red or nearly white on the same branch or on different branches of the same plant, and flowers, which are pale when they open, often become rose-color in fading. I am satisfied that I only saw one species in Japan, and, in spite of the judgment of Maximowicz (*Mél. Biol.*, xii., 484), who had much better opportunities for studying these plants in Japan than I had, I am inclined to agree with Franchet (Franchet & Savatier, *Enum. Pl. Jap.*, i., 205) that *Diervilla Japonica*, *Diervilla grandiflora* and *Diervilla floribunda* must be reduced to a single species which is widely scattered through all the mountain districts of Japan, and varies in size, in the amount of the pubescence on the lower surface of the leaves, in the number of flowers and in the length of the peduncles of the flower-clusters. *Diervilla Japonica* of Thunberg appears to be the name for this species.

C. S. S.

Cultural Department.

Asiatic Cantaloupes.

WE have a large extent of country where this fruit can be cultivated, and some of our soils and climates are better adapted to their growth than others. This year has been almost a fatal one in much of New Jersey by reason of the drought and insects. Delaware has done better, and Maryland has furnished a fair crop. Degeneration of a variety takes place in some localities much sooner than in others, and all imported seeds become smaller and of a light yellow. Some oriental seeds are dark-colored and quite large, particularly of the large varieties; but they at once become yellow and smaller, and in a few years are of the size obtained from our smaller melons, so that they cannot be told apart. All Turkish and Russian cantaloupe-seeds are large; some are gray, others are very dark yellow, and others, again, bright yellow. Turkish seeds degenerate in size in Turkey, but not as they do here even in a single season. Our seeds are nearly all light yellow. I have once seen a bright yellow seed, and once a brown seed, but the latter when planted here became light yellow. It came from Louisiana, and produced an *Acme*.

Oriental cantaloupes are generally green-fleshed, well netted, and grow readily here, except those of Russia, from Odessa, where they are said to be abundant, cheap and fine. Japanese Melons are a failure here, and have very tiny seeds and no netting. In size the best oriental melons vary very much; some weigh a pound, others twenty-five pounds. The best come from Armenia, Persia, and Turkey in Asia. They are round, oval, very long (fifteen to twenty-five inches) and drupe-shaped. We have had in our country four varieties from Armenia, fourteen from Persia and six from Turkey in Asia. Five have not been tried yet.

The Cassabah (accent on the bah) is not a Persian Melon, as nearly all of the seedsmen have it in their annuals, but originated in a town of the same name north-east of Smyrna. In some of the English maps it is spelled Kassaba, but my spelling came from a native of Smyrna, where the fruit is sold. This Melon came to our country more than twenty years ago, and is still grown, though it has degenerated in most places. It is the parent on one side of many hybrids, conspicuous among which was the Bayview, which appears to have run out. The original Melon was grown in 1896 in Cape May County, New Jersey, and three fruits weighed together more than thirty-seven pounds. In Turkey it grows fifteen inches long and weighs as many or more pounds. It is densely netted, is generally flattened by its weight in growing and is pointed at the stem-end. The flesh is green, the fibre rather coarse and flavor very good. A new hybrid has appeared in Maryland that is a very showy melon—the handsomest large melon that I have cut in twenty years—weight, eight pounds; dimensions, nine inches by seven and three-quarters and seven and a quarter; densely netted all over (it was grown on

the end), green-fleshed and well flavored. Like all large melons, it had a conspicuous fibre. The way to grow the Casabah is to keep some of the seeds of the first year until the variety degenerates or runs out, and then to plant some of the seeds to start the variety a second time. To save the seeds of a good cantaloupe precipitate them in water, pour off all the membrane and light seeds, rub the heavy seeds in a napkin and dry in the house. Preserve the seeds in a bottle and label carefully. Such seeds will germinate after a number of years. A good melon will yield 500 to 600 assorted seeds that ought all to grow.

The Taylor Cantaloupe of Persia was called after a Mr. Taylor

particularly adapted to its propagation. It soon degenerated in New Jersey where it was grown.

I have stated that this was a conspicuously poor year for Cantaloupes, and yet I had sent me the largest-seeded and finest hybrid melon I have ever seen—the handsomest large melon and the beau ideal of a green-fleshed melon. I have never seen as fine flesh in a melon six and a half inches long, although I have in fruits of half a pound in weight. This cantaloupe was egg-shaped and densely netted all over (it also grew on its end). It was ripe to the rind, which was grass-green in color, and had a wonderfully fine smell and taste. Such a growth would be a great acquisition to the horticulturalist.



Fig. 53.—*Diervilla Japonica*.—See page 404.

who was many years in the State Department at Washington. He distributed the seeds, and the variety was grown for the market for more than thirty years. It was a large cylindrical melon, densely netted, golden when ripe, green-fleshed (sometimes butter-colored), good-flavored, and weighed up to twenty-five pounds. I obtained the seed of one that was nineteen inches long and weighed nineteen pounds. The variety had then been grown some twenty-five years. It appears to have quite run out, or to have degenerated materially. When of large size it was a conspicuous object on a dinner table. The soil of Washington seems to have been

particularly adapted to its propagation. It soon degenerated in New Jersey where it was grown. Unfortunately, the hybrid, which weighed seven and a half pounds and was one and three-quarter inches thick in the flesh, had a very large share of unfertilized seeds and was alone in its growth. The seed that produced it was from a Louisiana Acme, which yielded several hybrids. An attempt will be made by several growers to reproduce this distinctive round hybrid, which has stellate markings in its coarse netting. It is particularly conspicuous in its thick flesh all around, except at the stem end and its very small cavity.

Philadelphia, Pa.

Robert P. Harris.

Grapes under Glass.

PROBABLY the most common mistake in the cultivation of grapes grown indoors is overcropping, though in the case of private gardens the fault is not always that of the gardener. The employer requires a large crop, and, in consequence, the finish of the grapes must be sacrificed. Finish is the end that every good cultivator strives to attain. By good finish we mean perfect color, richness of bloom, large, well-formed berries and good flavor. The vines contain but a certain amount of vitality, and if compelled to carry an overcrop they will carry it only so far and stop before a proper finish has been attained. Liberal feeding will certainly assist, but grossly fed vines never produce properly finished grapes. It is impossible to lay down a hard-and-fast rule of how many bunches a vine ought to carry, as the varieties vary so much in vigor and in size of bunch. It is considered by some good authorities that one pound to every foot of fruiting vine is sufficient, but we find vines capable of carrying considerably more. Much, of course, depends on the age and condition of the vines. Considerable difference of opinion exists among grape growers as to the stage at which syringing should be withheld, but our experience is that finish is always best when syringing has been discontinued after the time of setting. Some argue that syringing is necessary up to the time of coloring to keep down thrip and red spider. We find that this practice is rather productive of spider, as it tends to weaken the foliage and leaves it more susceptible to the attacks of insect pests when syringing must necessarily be withheld. It also hurts the bloom of the grape in the early stages of its formation, a period when it is easily damaged. Should red spider appear it may be expedient to give an occasional thorough syringing to the infected parts. This is not so hurtful as continued sprinkling, for, if the bloom is fixed, it will shed the water from the berries, providing it does not strike with full force on the bunches. The syringing should only be done when plenty of air can be given, as the shorter time the water is allowed to remain on the bunches the better. Airing is probably the most important of all details, and is especially troublesome during the spring months. The increasing brightness of the sun on the one hand, and the cold air on the other, make it somewhat difficult to keep the house at the proper temperature and at the same time avoid cold draughts. As the season advances the extremes become less marked, but when the grapes are coloring and it is necessary to leave a little night air on, there is the greatest danger from mildew. We make it a practice with the span-roofed houses to leave the air always on the west side, as we find that mildew makes its appearance generally during the prevalence of easterly winds, and by leaving only the west side open the cold draught is somewhat avoided. Toward the end of the season, when the leaves have become harder in texture, they are less subject to the attacks of mildew, and more night air being required for the ripening of the wood, it can be given with more safety. But full night air should not be given until the fruit is cut.

Watering is another important point, and the amount must be controlled to a great extent by the mechanical composition of the soil of the borders. If of a loose, open nature the supply should be large; if close and retentive, a smaller amount is required. In either case, when the grapes begin to show color a good watering must be given, and watering should then be stopped. If the soil is loose and open, much benefit is derived from a mulching of hay inside the house. This serves not only to retain the moisture in the soil, but helps to keep the atmosphere of the house dry. It is often found necessary to give the borders a thorough watering after the crop has been cut, when there is danger of the roots being too severely dry.

Tarrytown, N. Y.

William Scott.

Carnations, New and Old.

CARNATION growers in this vicinity have set their plants indoors for winter blooming. On the whole, the season has been unfavorable for Carnations in the open ground. August, when the plants usually make most of their growth, was very dry. Insect pests were numerous, and, despite the dry weather, fungoid diseases took such serious hold of several varieties that growers have hesitated to risk space for them indoors. Calculations are generally made in spring at planting-time for ample stock of the most desirable kinds, and it is likely to prove a serious loss to have to substitute less desirable kinds or surplus plants of other sorts for such as have failed. William Nicholson, of Framingham, Massachusetts, last season had a splendid lot of Eldorado, Shelmire's beautiful yellow of the Picotee type, which proved to be among

the most valuable of fancy varieties. Unfortunately, the plants in the open were so badly affected with rust this season that he would not risk taking them in. Bacteriosis is affecting some varieties badly, notably the new Della Fox and Alaska. The latter variety was a complete success everywhere last winter. Some growers pronounce it the best white-flowered Carnation up to date, and have discarded some of the hitherto standard varieties in its favor. With bacteriosis so prevalent, it would have been better to have grown a good supply of Mrs. Fisher as a reserve. Carnations have proved decidedly local in their requirements, and but few are universally floriferous. The variety William Scott is a notable exception. William Nicholson grows the variety which bears his name, perfectly, and in the Boston market it has always been a great favorite, and brought high prices. But he is almost alone in this success. Mrs. Fisher, though nearly yielding to Alaska in popular favor, is again in the foreground. The veteran grower, Joseph Tailby, of Wellesley, considers that Mrs. Fisher would be the ideal white-flowered variety if the stem were a trifle better than it now is. Mr. Tailby is an experienced and successful raiser of seedling Carnations, and now has several new white varieties of his own raising on trial, which, although excellent, are not his ideal. A cross between Lizzie McGowan and Mrs. Fisher is a magnified Lizzie McGowan, a type which is not successfully grown in the neighborhood of Boston. The flower and stem are magnificent. Another is Daybreak \times Mrs. Fisher, and nearly intermediate in character between the parent plants. Its defect, if any, is in showing a creamy centre. So indifferent have many new varieties proved (though probably locally successful) that growers have invested sparingly. Della Fox, the heavily tinted and so-called improved Daybreak, has been given a more extended trial than usual. Tailby & Son have a whole bench of it. As shown by the introducers, Myers & Santmann, of Philadelphia, it left nothing to be desired. The plants are, unfortunately, everywhere unhealthy. They are infested largely with bacterial disease, the most insidious and most difficult of all to eradicate. While we have no certain remedy as yet for these diseases, no grower need now be at a loss to know what ails his plants, thanks to the Carnation Society and their specialists. It is well known that spot, and, for that matter, all diseases of like character, increase rapidly when the soil is saturated with moisture, and, through imperfect drainage, does not dry out quickly. It is not economical to save coal when a little fire-heat, with plenty of ventilation, would keep the air moving and help to correct unfavorable conditions. It is better to have shallower benches and use water oftener, if need be. This is especially true on heavy soils. Cleanliness, above all things, is the best preventive of disease. It is hoped by all, and with good reason, that by attention to these details, as experience has shown in the case of Daybreak, Della Fox will come out free from disease as the season advances.

There have been fewer varieties of the distinctly maroon shade, of which Ferdinand Mangold is a good example, than of any other color. Ferdinand Mangold is so near the ideal that it is hard to improve upon it. Mr. Butterworth, grower for Mr. Powers, of South Framingham, has a good Carnation of this color on trial; but it is somehow peculiar in its needs, for even the originator has discarded it. It is exceptionally free and perfectly healthy, but not robust, and this is its weak point. The flowers are of good size, perfect in form, decided in color, fragrant, and the stem is ample and strong. Mr. Nicholson has a new crimson, which for size and beauty of form excels any I have seen. It is too early to decide what it will prove, but at present it appears too much set after the old border Clove Pink type. If it comes up to Mr. Nicholson's expectations, it will be named for Sir Henry Irving. A beautiful companion pink, William Scott \times William Nicholson, will be named for Ellen Terry. This is a success beyond all question.

Mr. Tailby and Mr. Nicholson imported some plants of Uriah Pike, the invincible English crimson, which they saw in England. Though peerless in that country, neither grower expected it would succeed under American methods, nor was it in any way a success. Mr. Tailby's purpose was to use it as part parent in some new types. Ferdinand Mangold \times Uriah Pike were his crosses, and out of 108 seedlings only four were single. All proved crimson, and, contrary to the rule which Mr. Tailby has almost invariably found to prevail, all the seedlings showed a marked preponderance of the character of the pollen parent. This was not desired, and only a better constitution was wanted. A dozen of the seedlings have been taken indoors for trial, but probably only one will be found of especial merit. For this he has already received a tempting offer from a notable English firm, who are thinking of taking up the American plan of culture. The flower is per-

fect in form, magnificent in build and livelier in color-tone than the flowers of either parent. Its habit indicates that it will be sufficiently floriferous. Mr. Tailby is equally fortunate in the possession of a good scarlet, *E. G. Hill* × *Florence*. It is quite equal to *Portia*, and more robust in habit. To displace *Portia* it must have good staying qualities, for this standard old variety is as yet without a peer on the market in the matter of productiveness. William Scott still holds first place among rose-colored varieties now in cultivation for profit. But for one defect, a rather serious one for the retail florist, it would be perfect. Its rich pink tones quickly fade to purple, and this often happens before the retailer disposes of his stock. The old *Grace Wilder*, once the favorite, but now out of constitution, when at its best was equal, if not superior, to anything we have ever had. The flowers were salable as long as they remained fresh.

Donald Macrea, of Framingham, Massachusetts, has the white-flowered *William Scott*, which, if it holds true to the flowers now open, promises to be an acquisition. *Corsair*, a fine crimson, also looks promising.

Wellesley, Mass.

T. D. Hatfield.

Violet Culture in Pots.

THE growing of Violets in pots for winter flowering is not a new method, but it is not so extensively employed as its general utility deserves. Since adopting this system we have been enabled to produce blooms superior in size and color to any we ever had from plants grown on benches, and, what is of more importance, the plants have yearly increased in general vigor and exemption from disease. Being in a portable condition, they can be kept in pits or frames until *Chrysanthemums* and other fall-flowering plants are gone, and as by that time they will be well established in the pots and blooming freely, they will continue to do so in the greenhouse under proper cultural conditions.

The plants are set in the field to make their summer growth in rows eighteen inches apart each way; they are kept scrupulously free of weeds and useless runners. About the last of September the best plants are lifted and placed in well-drained seven, eight or nine inch pots, according to their size. On taking them up the soil is well shaken from the roots, as it is desirable to have as much fresh compost in the pots as possible in a lumpy state, and lightly firmed with the potting lath. When potted they are taken to the frames and are given a thorough watering, the sashes, lightly shaded, are put on, air is admitted freely day and night while mild weather continues. When dry they are watered, and they get an occasional syringing on bright, mild days and are covered with mats and shutters to exclude frost. All these details are carefully and persistently attended to until the plants are transferred to the greenhouse.

The *Marie Louise* is the principal variety used, and as an early and prolific bloomer is unequaled. The *Farquhar*, *Lady H. Campbell* and *Swanley White* are also grown, and it is worthy of mention that all these varieties, growing side by side and receiving identical culture from the cutting to their flowering state, are in a uniformly vigorous and healthy condition.

South Framingham, Mass.

A. McKay.

Some Autumn Flowers.

Zinnia Haageana.—All the *Zinnias* bloom late into the season, but this species is superior to any of the common large-flowered kinds. It is of compact dwarf habit, each plant forming a little bush twelve inches in height, densely studded with its orange-yellow blossoms. It is not as coarse a plant as our ordinary *Zinnias*. The leaves are much smaller; the flowers are only an inch and a quarter in diameter, but they are very double, and make up in numbers what they lack in size. In many respects I prefer *Z. Haageana* to the less shapely kinds with larger blooms. It is decidedly one of the best of the late-flowering annuals, thriving satisfactorily in even the poorest kinds of garden soil.

Anemone Whirlwind.—No flowers are more useful than the Japanese *Anemone*, and in addition to the single forms of this plant, the variety with semi-double flowers has greatly added to their importance. *Whirlwind* is a semi-double form of the old white variety of *Anemone Japonica*, and although not more decorative than the older kinds as a garden plant, the cut flowers are more lasting. It is now showing its first blossoms, and with continued mild weather will provide flowers for cutting until the middle of November.

Clematis paniculata.—This now well-known plant is annually becoming more and more popular. It is generally grown as a trellis climber, and there is nothing to equal it for this use at

this season. Its creamy white blossoms completely obscure the foliage, and they persist for weeks. I have lately seen the plant used with good effect in covering unsightly tracts of rubble and barren soil. The roots, of course, were well taken care of, the site and soil being specially prepared for them, and from the stems spread rapidly in all directions. The unearthed roots and stumps of old trees, piled in an oblong or irregular mound, make a picturesque groundwork for this and other climbers.

Caryopteris mastacanthus.—One must search a long time to find a more attractive little shrub at this time of year than this rare old Chinese plant. It is very dwarf and bushy, making a compact little mass from two to three feet high. The notched leaves are deep green on the upper surface, and whitish beneath. The small pale blue flowers are borne in conspicuous axillary clusters, and they are produced so freely that the plant is now a mass of bloom. There is, too, an indescribable daintiness and elegance about the arrangement of the stems and flowers. That so good a plant has escaped general attention for so many years is a mystery. It is now, in the last days of September, a perfect picture. To its charms it adds the merit of hardiness, and its cultural requirements are quite ordinary. Isolated on the lawn, or mixed with other dwarf plants in the shrubbery, it is alike effective.

Floral Park, N. Y.

M. Barker.

Correspondence.

Additional Notes on Compass Plants.

To the Editor of GARDEN AND FOREST:

Sir,—It is evident from the statements of the note in *GARDEN AND FOREST* of August 19th about the usefulness of the leaves of the Compass Plant for determining in a general way the direction of a north and south line, that they would furnish no help to distinguish north from south. The plant would only be of use as a compass when the sun is hidden by clouds, for on a clear day the sun itself would be a better guide. When most needed the leaves might utterly fail in usefulness if a traveler lost his initial direction, which is very easy, and is readily increased by the well-known tendency of a bewildered person to move in a circular direction. Hence, he might soon be taking a direction directly opposite the one he wished to take. But there is another habit of the Compass Plant which might be used to correct this. Dr. Engelmann says in the article referred to in my former note: "The large flower-heads, on short and very thick peduncles, are almost invariably turned eastward." This is the only allusion I have seen to a habit which I have often observed and verified, nor have I any information that any use has been made of it in practice. A person standing on the east side of a field of Compass Plants and facing the west sees a mass of yellow before him; let him change to the west side, and the diminished intensity of color at once becomes apparent. When the plants are examined individually it is seen that nearly all of the flower-heads face him in the former case, and that the south is to the left hand. There is about the same reliability to be placed on this eastward turning of flower-heads as on the north and south trend of the leaves. It is quite general, but not definite in many cases of individual heads. Hence, during the floral stage of a Compass Plant, it is not difficult to distinguish north from south.

I have not been able to find a satisfactory reason for the curvature of the peduncles which turns the heads to the eastward. Light and gravity, resulting in heliotropism and geotropism, are now given as the main causes of such tendencies. Heliotropism, or the bending toward the direction of the incident rays of light, may be the primary cause here, but it does not explain why the turning is eastward rather than westward, unless we assume that the rays of the morning sun are more potent than those of the afternoon sun. The flowers, like the leaves, place themselves so that the largest surface is perpendicular to the direction of the longest continued light. A leaf with its surfaces in a vertical plane directed north and south is in an attitude to receive light more evenly on both sides throughout the day than leaves ordinarily placed with an upper and an under side, and there results from it in Compass Plants a more equal distribution of stomata on the two surfaces, so that, though structurally with ventral and dorsal surface, they are practically without it. Heliotropism is taken by Stahl and others to explain this leaf position.

The heads do not follow the sun. The short and thick peduncles, three-fourths of an inch to an inch and a half long, are too stiff to allow much daily turning. Nor is the eastward

bending due to the open flowers; it begins early and may be seen when the plant is in bud. Peduncles arising from the north and the south sides of the stem are found verging toward the east from the start, or they curve near the top so as to bring the bud into the position which will be taken by the head when expanded. Those springing from the east side are naturally in place to look eastward, the top of the peduncle curving over. Those on the west side are scarcely disturbed. It would be too great an effort and require too much force to turn them without coming in contact with the stem, and if heliotropism is the force they are in position to get the rays from the west. Three-fourths of the heads in a symmetrical plant are, therefore, normally in place to turn eastward more or less readily. Even less than the normal fourth are usually found on the west side of the axis of growth. The long continued effort of the plant to bring its leaves into the plane of the meridian seems to have resulted in a preponderance of leaves on the north and south sides of the stem, an approach to a two-ranked arrangement or flattening of the axis of growth, and as the peduncles spring from the axils of leaves and bracts there is the same tendency in the flower-heads. These vary in number from a single head at the top of the stem to twenty-five or thirty on a large, branching plant, from five to ten being the most common number. When they are crowded at the top of a stem or branch, or somewhat bunched in their arrangement, with less freedom for the curvature of the separate peduncles, the stem bearing the group usually curves to the eastward, the combined weight of the heads probably helping in the process. When the heads become old or reach the fruiting stage the peduncles in many cases straighten, and more of the heads when in fruit look upward.

The heliotropic force is more conspicuous in the flowers of the Prairie Dock, *Silphium terebinthinaceum*. The heads are smaller and lighter, on more slender peduncles two to five inches long. The stem is usually taller and generally provided with several slender, spreading branches, and is so free from leaves, except at the very base, as to be scape-like. The heads, as a whole, are turned to the east, but between the hours of ten and twelve the majority are plainly seen to face the south-east. The afternoon sun does not draw them any farther around, but they continue in their forenoon position, but look eastward in the morning. In this they manifest a slight tendency to follow the sun.

The twisting of the leaves and petioles of the two *Silphiums* and of the Prickly Lettuce to bring them into the meridional and vertical planes is spiral in its character. A stem-leaf with a horizontal base and a vertical tip or upper half is spirally turned. The motion is with the sun, from left to right, or, to use the common illustration, with the hands of a clock. A leaf on the south side of the stem has its upper face turned to the west, one on the north side has it turned to the east, those inserted on the east and west sides are turned around more or less to the south and north, so as to bring their extremities into a position somewhat parallel with the former. This is quite easily discerned in the Prickly Lettuce, a much more leafy plant than the *Silphium*. The leaves of the Wild Lettuce, *Lactuca Canadensis*, frequently show the workings of this same force, the ends of the leaves being more or less spirally rolled from left to right as they are followed around the stem. A quarter of a turn serves to bring most of the leaves of these Compass Plants into the required position. Occasionally the petiole of a radical leaf may be turned through 270 degrees. Evidently the same force is at work here as in twining plants, which for a given species turns them in a definite direction, either with or from the sun.

My observations on these plants have been made on those growing in the open prairie, where they receive the full sunlight. If they stand by the borders of woods, or in partial shade, owing to interference with the light the results may be quite different, or not shown at all normally.

Chicago, Ill.

E. J. Hill.

The New Ozark Iris.

To the Editor of GARDEN AND FOREST:

Sir,—During the past two years several articles have appeared in GARDEN AND FOREST relative to the new Iris found by me in the Ozark Mountains, and named by Mr. J. N. Gerard *I. hexagona*, var. *La Mancei*. All these articles have dwelt upon the beauty of the flower and its increase in point of size and intensity of color over the ordinary type of *I. hexagona*, itself a handsome and striking species.

I find that in other respects this new Iris departs far, from the *Hexagona* type. It blooms ten days earlier and more profusely. *I. hexagona*, under our hot suns, ripens its seed-

capsules by early midsummer, and the foliage dies down immediately after. Farther north this early dying down of the foliage, and consequent ripening of the rhizomes, may not be a characteristic of the plant, as Gray makes no reference to it, but here it is a noticeable feature. The variety, however, keeps green until autumn, the lower leaves alone dying in late summer.

There is a marked variation in the seed-capsules. In *I. hexagona* the seed-pod is oblong-cylindric, six-angled, two inches long. In the new plant the capsules are globular, one and one-eighth inches long, and but a sixteenth of an inch less in diameter. The seeds are a trifle smaller also, but of the same general shape and color.

Pineville, Mo.

Lora S. La Mance.

Yarrow as a Lawn Plant.

To the Editor of GARDEN AND FOREST:

Sir,—In your issue of the 9th instant appears a note in regard to *Achillea Millifolium* as a lawn plant. The plant your correspondent refers to is, without doubt, the European variety, which seems to be quite distinct from the native form. It is not so rigid as our plant, and seems much better adapted for turfing. About ten years ago I noticed it growing on a steep, dry bank near the University buildings in Toronto, and making a very good ground cover where nothing else would grow, and I agree with your correspondent that it is a useful plant in such situations.

Botanic Garden, Buffalo, N. Y.

John F. Cowell.

Utilizing Choke Cherries.

To the Editor of GARDEN AND FOREST:

Sir,—Mr. Waugh's letter, under the foregoing title, in your No. 448, may be confirmed by other experience than his own. It is years since New York summer residents of Vermont adventured to make jelly from choke cherries and found it to be delicious, and even of peculiar excellence.

The native Vermonters neglect or despise this wild fruit, but that is only fortunate for the people who wish to use it.

New York.

J. E. Learned.

The Forest.

The Burma Teak Forests.—X.

MILITARY MEN EMPLOYED AS FOREST OFFICERS.

A LATE article in GARDEN AND FOREST noticed the practice, when forest administration was first organized in India, of employing military officers. The work had to be done, and we could not wait until professionally trained men were available for it. Military officers, and in some cases medical men, were selected; young men of active habits and good constitution, good business capacity, sportsmen or botanists, with tastes which were likely to make them take kindly to solitary life, hard work and exposure in the forests. A number of the men thus selected have done eminent work in helping to build up forest administration in India. Colonel Pearson has the great merit of being the first to protect forests on a large scale and in a methodical manner against the ravages of jungle fires, and he did this, as he himself delights in acknowledging, not only against the powerful opposition of nearly everybody, natives as well as Europeans, but also against the strong misgivings of his own heart. For to interfere with this ancient institution which cleared the ground in the hot season of inconvenient grass and underwood seemed little short of impious interference with time-hallowed custom. But Colonel Pearson succeeded, and no one was more pleased than he himself to see the change which took place, as if by magic, in the forests thus protected. This was in 1864, and since that time fire conservancy is universally recognized as the most important part of forest protection. One-third of the total area of state forests in the British Indian Empire is now every year protected against the fires of the hot season. Another military officer who should here be mentioned is Colonel Bailey, of the Royal Engineers. In 1872 he organized the topographical survey of the forests, and afterward, when the necessity began to be recognized, of providing a large number of professionally trained native forest rangers; he established the forest school at Dehra Dún, and for many years filled the post of director of that institution, and of Conservator of the School Forests. To these names I might add many others of military officers who in the early days of forest administration in India have done excellent work. On this point I lay great stress in order to show that under certain circumstances, and under good professional

guidance, military officers may with great advantage be employed in forest work.

PROTECTION OF THE FORESTS.

For the protection of the forests, however, it would have been a serious mistake to employ a military force in India. The employment of troops as a police force for the protection of the Yellowstone Park and other Reservations in the United States, doubtless, is the right course to pursue in order to enforce efficient protection against timber thieves who would rob the forest, and herdsmen who would otherwise set fire to it, in order to produce better pasture for their sheep. Where public property and the vital interests of the nation must be protected against the selfish cupidity of individuals the rigid discipline and the stern action of the military force are necessary. In India matters were different. The ruling power, it is true, was always regarded as the proprietor of all waste and forest that had not been alienated, but the people living in the forests and in their vicinity had been in the habit, from time immemorial, to use the forest for their own requirements, to cut wood and bamboos, to graze their cattle, to clear and burn the trees for their shifting cultivation. When the work of demarcating state forests was commenced, the question arose, how this customary user of the forests should be dealt with. From the outset I insisted upon what I considered as the only just plan, namely, that the customary user should be regarded as a right, but as a right which the Government, as the guardian of the public interests, had power to regulate, to commute, and, by the grant of equitable compensation, in land or in money, to extinguish. This view of the case was accepted and embodied in the forest laws which were passed successively for different parts of the empire. But the provisions of these laws were enforced with due consideration for the habits and customs of the people, and the employment of a military forest police would have been a great mistake. In Burma and in other portions of the empire was it possible, by giving congenial and profitable employment to the inhabitants of the forests, to make them our allies, and to enlist their interest upon the side of forest protection, but this was not everywhere possible. The establishment, the efficient protection and the regular methodical management of the forests unavoidably interfered with the habits and prejudices of the people, and although just and equitable compensation was always liberally given, still the alteration of circumstances made itself felt. It is true that the area of reserved forests in the whole of the provinces under British administration amounts to only 7.5 per cent. of the total area, and that in most provinces the forests are situated on the hills, away from the open, densely inhabited country. But, nevertheless, their aggregate area is very large, 71,600 square miles, or forty-six millions of acres. And as just related, from more than one-third of this area has it been possible to exclude fires. The demarcation of a reserved forest, its efficient protection, and particularly the prevention in it of the annual jungle fires, are measures which completely alter the aspect of the country and which unavoidably, in many respects, interfere with the old-established habits of the people. The small amount of dissatisfaction that has, fortunately, manifested itself among the people concerned, proves that the forest laws have been administered in a considerate spirit and with due regard to their habits and prejudices. And this could not possibly have been effected if the protection of the forests had been undertaken by a military force.

TEAK AND BAMBOOS.

Like the Oak and the Scotch Pine, the Teak-tree demands much light. As already mentioned, it does not, as a rule, form pure forests, and it thrives best where the ground is protected by a dense underwood of Bamboos, which forms a lower story of the forest thirty to sixty feet high. This underwood of Bamboos is analogous to the lower story, which the Beech, the Hornbeam and the Silver Fir in Germany form under the Oak or the Scotch Pine, and which, according to Pinchot and Graves, in Pennsylvania the Hemlock forms underneath the White Pine. The Bamboo, therefore, may be regarded as a useful companion, a friend and ally of the Teak-tree, but in young Teak plantations it often is a most formidable enemy. The forest cleared by the Karens for their *toungyas*, to a great extent, is composed of Bamboos. Each Bamboo clump consists of two portions. Underground is an entangled network of rhizomes, while above ground rises the gigantic tuft of hollow woody stems. The rhizome is not, as a rule, killed when the *toungya* is fired. During the first few years these rhizomes produce slender shoots, but gradually they recover their strength, and then all at once a number of stems grow up of the ordinary thickness, and at once attain their full height, which varies according to the species, *Dendrocalamus*,

thirty to forty; *Bambusa polymorpha*, which is the species that prevails in the moister forests, from fifty to sixty feet. At that time the young Teak, if properly cared for, is extremely vigorous, the stems, fifteen to twenty feet high, on the current year's shoot, with four to five pairs of leaves two to three feet long and eight to ten inches broad. Weeds, seedlings and coppice-shoots of other trees no longer endanger its existence if the early cleanings have been carried out regularly, and the plantation seems safe. At that time, however, the Bamboo-shoots come up all at once in dense masses, the Teak is overtopped, a large proportion of the plants is killed, some linger with a few miserable leaves under the dense shade of the Bamboos, while others continue the struggle, but are mostly forced up into long, slender, weak stems. Here prompt and vigorous action is needed in cutting back the Bamboos. Obviously Teak plantations, particularly those established on *toungyas* in the heart of the forests, require constant care until the Teak has overtopped the Bamboos, which is not generally the case before it is fifteen to twenty years old. The Bamboos associated with Teak in the Burma forests have been compared to the companions of the Oak in Europe, and the White Pine in North America, to the Beech and the Hemlock. But the life-history of the Bamboo is very different. When the stems, which constitute the Bamboo clump, have attained a certain age they produce flowers, and after ripening their seed they die off, and in most species not only all stems of one clump, but all clumps in one district, bear seed and die. The dead stems fall and form a tangled mass of Bamboos, through which it is hardly possible to force one's way. The fires of the next hot season, however, sweep away this dry mass, and when the rains set in the enormous crop of Bamboo-seed germinates, and the result is a carpet of young slender Bamboo-plants, a portion of which, after a series of years, grow up into clumps. Hence, the flowering and seeding of the Bamboo is an event of great importance, which recurs after a certain number of years; thirty years in the case of some species, forty in the case of others. At that time, when the cover overhead is thus suddenly removed, the seeds of Teak and other trees which have not been destroyed by the conflagration get a chance and grow up.

Bonn, Germany.

Dietrich Brandis.

Recent Publications.

The Nursery Book. Third Edition. Macmillan & Co., New York.

This is not merely a reprint of the manual which was issued some half-dozen years ago under this title, but it is a thorough revision of that work with much new matter, with many more illustrations, and with the nursery list expanded and brought down to date, so that it honestly fulfills the promise of its subtitle and is "A Complete Guide to the Multiplication of Plants." The chapter on Pollination, which was in the original book, is not found in this edition, but this leaves space for much other practical matter like the discussion of the question whether plants propagated by grafting are constitutionally weakened by this process. It ought to be said that the useful notes on pollination are not lost, but are now included in *Plant Breeding*, another book belonging to the series aptly named "The Garden Craft Series," which now includes, besides the two we have named, *The Horticulturists' Rule Book*, with the promise that others are in preparation. Altogether, *The Nursery Book* is in every way a helpful little volume which may be safely trusted by the novice as a guide to all ordinary manipulation which is required for the propagation of plants, and even the skilled propagator will find it convenient to have such a handy volume within reach for reference in matters where his memory is at fault, or in some particular where his experience is limited. In the popular language of this country the word nursery has come to mean an establishment for propagating trees and shrubs. It need hardly be said that this work is not so limited in its scope, but treats of the multiplication of all plants, whether woody or not, in every practicable way.

Notes.

Five houses of Messrs. Dailledouze Brothers are now filled with new crop Carnations, the houses measuring 125 to 200 feet in length. Flowers have been cut from these plants for

three weeks past. William Scott and Daybreak are the pink varieties now in season, the dependence for crimson and dark red being upon new seedlings. Lizzie McGowan is the only white sort being cut in these houses, and the variegated Helen Keller and Minnie Cook complete the list.

The Rural New Yorker praises the Japanese Ipomœas which have been sold for a few years past under the name Emperor Morning Glories, for the size and brilliancy of their flowers with their sharp color-contrasts of fiery red, blue-black, indigo, maroon, bronze and white. We have observed these vines covering a heap of old stumps and they proved very effective. It is to be hoped that they will not be as difficult weeds to get rid of as the old-fashioned Morning Glory, which itself, by the way, is one of the most beautiful of flowers.

The Beach Plum, *Prunus maritima*, is a desirable shrub or small tree at all times, and it can be specially commended at this season for the beauty of its abundant fruit. This fruit, though, as a rule, somewhat astringent, varies greatly in its edible quality, and we have lately received samples of it which had just enough of the Wild Cherry flavor to make it piquant. Some Beach plums sent to this office by Mr. Jackson Dawson, of the Arnold Arboretum, were dark purple, with a distinct bloom. Others received earlier were red, others still a clear amber-color, and all were quite as palatable as many cultivated fruits.

A correspondent of *The Country Gentleman* writes in an interesting way of a visit to a large farm in England where medicinal and aromatic herbs are cultivated. Henbane, Belladonna, Poppies, medicinal Rhubarb, and Aconite, are grown with Marigold for its tincture of calendula, Lavender for its perfume, Pansies for the oil of violets, and many more. The farm has its own laboratory for chemical work, but the writer thinks that if adjoining farms would unite to raise some of these herbs, a coöperative laboratory for getting the product into marketable form could be run in the same way as creameries now are.

The abundant clusters of lilac-pink fruit which are now seen on *Callicarpa purpurea* makes this a most interesting shrub. Since the flowers and fruit are borne from the axils of its opposite leaves, these clusters of twenty or thirty little berries are arranged regularly in pairs along the slender branches for a distance of two or three feet, and they are so numerous that the branches arch in a graceful way under their weight. The shrub is only two or three feet high and the flowers are inconspicuous. An American species, *C. Americana*, bears still more beautiful fruit, but it is not reliably hardy north of Washington.

The Gardeners' Magazine gives illustrations of two new single Pœony-flowers, one of which, Mikado, is a beautiful shade of reddish rose, with a soft rose-buff centre, while the other, named Margaret Atwood, is pure white, with a clear yellow centre. The flowers are said to have stouter and more substantial petals than those of most single Pœonies, so that they will stand well in water when cut. The varieties were introduced from Japan, and the Messrs. Wallace, of Colchester, who raised them, received an award of merit from the Royal Horticultural Society. We have always commended single Pœonies for their beauty both on the plant and when cut, and we cannot have too many good varieties.

Of the seventy odd thousand trees in the streets of Washington, D. C., fully five thousand were uprooted during the gale on Tuesday evening of last week, and of those remaining a very large proportion were very seriously injured. In the parks the damage done to the trees was equally severe, especially so among the fine specimens in the grounds of the Executive Mansion and in the Smithsonian grounds. It was impossible to get near the White House with a vehicle of any description on Wednesday morning, owing to the fallen trees. The Silver Maples are the worst sufferers, scarcely an uninjured tree of this species being left; the Ginkgoes, the Honey Locusts and the Elms stood the gale well. In the parks some locust specimens of *Libocedrus decurrens* snapped off like pipe-stems, and on examination the wood was found to be perfectly sound. The greenhouse structures in the outskirts of the city were badly shattered, one firm suffering to the extent of ten thousand dollars.

There are many Orchids which are known only from descriptions published long ago, and very imperfect ones at that, so that it is not always easy to identify them. *Stanhopea Warscewicziana* was originally discovered on Mount Chiriqui, in Central America, and flowered in Berlin in 1852, and was soon

after described under its present name. A figure was afterward published by Reichenbach, and then the plant appears to have been lost sight of. We learn from the *Orchid Review* that this *Stanhopea* has just flowered in the collection of J. B. Hodgson, Esq., Newcastle-on-Tyne, from a plant received from Costa Rica two or three years ago, and the reappearance of this long-lost species is a matter of some interest. Reichenbach's figure shows a flower of bright yellow, with the exception of the column, while that of Mr. Hodgson's plant is much lighter, though identical in structure, from which it appears that the species may be variable in this respect, although the figures in Reichenbach's work are often so badly colored that one cannot place too much reliance on them. The flowers have a strong aromatic perfume.

Marquis de Montmort is the *Chrysanthemum* most frequently seen in the florists' windows now, a comparatively new French flower, but not grown for cutting until last season, when it was first offered in this city on September 30th. The main supplies of early *Chrysanthemums* have been coming from Dailedouze Brothers, in Flatbush. These growers sent the earliest flowers of Marquis de Montmort this year on September 22d. They are a pleasing pink, not unlike Vivian Morel, and considered the best early *Chrysanthemum* of this color yet grown. The flowers are Japanese in type, of good size, and the stem and foliage are excellent. The plants are tall-growing, reaching five feet in height. A few blooms of the same variety came from P. H. Scudder, Glenhead, Long Island, on September 21st, a day earlier than the larger cutting made by Messrs. Dailedouze. The earliest *Chrysanthemums* of all in trade in this city were flowers of the small pink variety, Madame Marie Masse, which came from Messrs. Garrett & Rose, of Jersey City, on September 17th; these were followed on the succeeding day by flowers of Madame Gastellier, one of De Laux's introductions, a variety not unlike Madame Ferdinand Bergmann, and the earliest white *Chrysanthemum*. Lady Fitz Wigram, an English variety first seen here last season, has been in market since September 22d. The flowers are a clear white and of medium size. The plants are very dwarf growers and have the fault of setting buds too early. Varieties ready for cutting during the early part of the current week are the clear white Chinese Madame Ferdinand Bergmann, the substance of its petals giving it good keeping quality; the Japanese Merry Monarch, also white, and with larger flowers, and the well-known yellow, Marion Henderson. Yellow Queen, J. E. Lager and Harry L. Sunderbruch, all good yellow varieties, will be in flower by the close of this week. The season for early *Chrysanthemums* is nearly a fortnight in advance of last year.

The novelty in the fruit stores this week are the so-called winter cantaloupes, which can be had for thirty cents each. The variety on sale comes from Spain, and owing to its long-keeping qualities the melons endure the sea voyage very well and are offered in fair condition. They are green, egg-shaped, with a hard shell, of good flavor, and have the distinct odor of muskmelons. There are a number of varieties, some with salmon-colored flesh and some with green flesh and a solid interior like a cucumber. Those in the market now belong to the class known as White Antibes with a soft interior and loose seeds. English filberts, in their hulls, are already seen in the fruit stores. Gravenstein, King, Pound Sweet, Snow and Fall Pippin are rated highest of the apples now in market, though the abundant crop makes low prices for even the best of this fruit. Nearly 50,000 barrels were sent to wholesale dealers in this city during last week, and more than 200,000 barrels have been handled in the local trade since the first of September, against less than 83,000 barrels in the corresponding period of last year. California fruits are still coming east in large quantities, the heaviest shipments of the season to this city having been received during the week ending September 26th, when ninety-five car-loads came, and as many as fifty-seven car-loads were sold here during last week. Grapes and plums comprise the greater part of these receipts. Selected Seckel and Bartlett pears, from cold storage, command good prices; other pears now offered are Beurre Bosc, Sheldon, Beurre d'Anjou, Clairgeau, Louise Bonne, Comice, D'Alençon, Winter Nelis and Duchess. As many as 22,050 barrels of Jamaica oranges have already been sent to this city this season, and 1,000 boxes of this fruit were last week forwarded to England on special orders. A single cargo which arrived last week contained 601,000 cocoanuts. A further idea of the immense quantities of staple fruits consigned to this market may be had from the importations of bananas during September, which amounted to 376,875 bunches, and 1,750,000 boxes of lemons were imported during the past nine months.

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The Artistic Element in Engineering.

AT the Buffalo meeting of the American Association for the Advancement of Science, Professor Frank O. Marvin, of the University of Kansas, and Vice-President of the Section of Mechanical Science and Engineering, read a paper on the subject which we have used as the title of this article. It might be considered impertinent for one who did not belong to the engineering fraternity to state that there is little or no attention paid by that profession in America to considerations of beauty; but this is precisely what Professor Marvin declares, and his paper is a plea for the recognition of the artistic element in engineering and mechanics. In the swift development of our country, the economic efforts of the engineer to "direct the great sources of power in nature for the use and convenience of man" have been devoted so persistently to the attainment of quick profits as to cloud that broader view which looks toward the higher and fuller life of the people. Of course, when engineering practice is based on immediate results in dollars and cents, the æsthetic element holds a secondary place, although, even from this standpoint, beauty often pays. But, after all, the engineer is primarily a designer, and if the design ignores the artistic element the thing created falls short of its highest possible good and fails to furnish that indefinable something which helps man to a richer and more refined existence. This results in manifest loss to the community, for all the useful works of the engineer may also satisfy the natural craving for beauty and there may be as much fine art in a well-planned machine for making some article of daily use as there is in a good picture or statue. There is no antagonism between what is useful and what is artistic. Good taste may be displayed in constructing a bridge or a reservoir without expending an extra dollar of money or disregarding its requirements for strength and convenience; but while American engineers are courageous and original designers, and while they have shown themselves capable of fulfilling the scientific and financial demands on their profession, Professor Marvin argues that they have paid little or no attention to artistic possibilities in their practice. For example, the American bridge satisfies the considerations of

stability and least cost, but it has little of the beauty of line and balanced proportion which makes it harmonize with the landscape or makes it attractive when considered by itself. It is true that a truss with parallel chords does not lend itself readily to artistic treatment, and added ornament for its own sake is never helpful. But in the proper treatment of the organic lines, the length of spans, the relation of the length of panel to height of truss and the location of piers and their forms, very much can be done and has been accomplished in such examples as the Brooklyn and Washington bridges of this city.

Professor Marvin goes on to say that in all the intricate problems connected with municipal engineering there is an almost absolute failure to give expression to any artistic idea in public works of this sort, and although in some water-supply plants the idea of beauty has not been entirely neglected, the ugly stand-pipe with a conical cap, so often seen in smaller towns, gives evidence that the designer never had a single thought of mitigating its unsightliness, while the people whom it ought to offend daily have never uttered a word of protest, and, indeed, have never dreamed that there is another and a better way of treating such works. Professor Marvin seems hopeful that a change in public and professional sentiment will come in time, but he declares that the schools of engineering are doing little or nothing to help the student in this direction, and that so far as he knows there is but one American textbook—Professor Johnson's book on Bridges—which includes any discussion whatever of the principles of æsthetic design.

We have presented only an outline of Professor Marvin's address, but few persons will dispute his thesis that in the industrial and constructive arts we pay no heed to considerations of beauty. The eminent German who visited this country as a commissioner did not state the case too strongly, perhaps, when he reported that "in America public works are executed without reference to art." For many months the work of enlarging the approach to the New York terminus of Brooklyn Bridge has been going on and a structure has been about completed in one of the most conspicuous points of the city, and through which thousands of civilized men and women pass every day. Most surely the vestibule to such a work as the bridge ought to have some dignity of its own, or, at least, it should have some harmonious relation with the bridge. The commissioners in charge of this work are gentlemen of distinction and public spirit, and yet no one who looks at it would ever infer that they felt the slightest responsibility to satisfy man's natural longing for fitness and proportion and his natural preference for beauty over deformity. If they have any feeling for the claims of art themselves, it never has occurred to them, apparently, that the people have sensibilities which are to be respected, and this is a single example of what is almost the universal rule. This contempt for every canon of good taste begins with the very ground plan of our cities, where the rectangular street system, usually adopted, is not only inconvenient but destructive of every attempt at a comprehensive scheme of urban decoration in the way of public buildings or works of art. Monotony in the direction and width of streets becomes a weariness to the eye. There is no relief afforded by open spaces, no respect for the original contours of the land, no opportunity to give importance or impressiveness of situation to any great public building. As New York spreads northward we are losing a priceless opportunity to take advantage of the variety of surface and outlook and make the annexed district the most picturesque city in the world. We build miles of piers and wharves without considering that the treatment of the water-front is full of artistic possibilities. Our railroads gash their way across beautiful scenery, and no one so much as asks the question whether these structures could not be made so as to leave fewer scars upon the landscape. In this way we obliterate the beauty of the natural world and pile up constructions of our own which seem to rejoice in their naked and obtrusive ugliness.

Now, public officials and the executive officers of great corporations will pay heed to the claims of art in their constructions as soon as the people demand it. That no such demand is made, however, is hardly a proof that the æsthetic sense is lacking in America, for there is abundant evidence that our people appreciate good work when they see it, and our architects, painters and sculptors have proved that they have ideas and can express them. The trouble is, we have lived so long in a society which utterly ignores art in its public works that the people, as a rule, do not know that there is any other way of doing things. Nevertheless, if the looked-for improvement is to come soon, the engineer must not wait to be driven by an educated public sentiment. He is a creator. He must take the lead, and what he does must be the result of a trained taste and a thorough instruction in the principles of æsthetic design. If Professor Marvin is correct in his statement that none of our technical schools offer a training of this kind to the young engineer it is high time that this defect was remedied. An architect is considered quite uneducated if he has not been schooled in the rules of art and cannot apply these principles to his work. There is no reason why the engineer should not recognize the claims of art, should not love what is beautiful, and should not do his work artistically. He comes close to our lives in a hundred ways at home, in our business, in our pleasure. He should direct and refine public taste, and not lag behind it in this movement toward a higher level.

THE second growth of timber upon stump lands is being investigated by the University of Minnesota, and the results are to be published in a bulletin. Minnesota being the last state in which White Pine is found in considerable quantities, it is the best available field for such a study, and it is well that the work is begun before it is altogether too late. It is much to be regretted that this study was not taken up by the older states and in time to make plain the utility of protecting the forests against fires from the beginning.

That American forests may be restocked as they are in Europe by logging in such a manner as to provide with certainty the necessary conditions for a second growth there can be no doubt; but how far nature can be expected to restore forest growth under the methods of lumbering now practiced, is quite another question, and its answer will be awaited with interest. This work we allude to has been placed in charge of Samuel B. Greene, Professor of Horticulture and Forestry in the University, with Mr. H. B. Ayres in the field.

Cedrus Atlantica.

A FEW months ago a view of a forest of the Mount Atlas Cedar, in Algeria, was published in this journal (vol. viii., p. 355), and our illustration on page 417 of this issue shows in greater detail the trunk of two venerable wind-swept Algerian Cedars. It is made from a photograph taken last year by our correspondent, Monsieur Maurice L. de Vilmorin, of Paris, to whose courtesies we are indebted for the privilege of reproducing it.

Early Autumn in the Pines.

THE Pines are gorgeous with color now as the leaves ripen, with no frost to mar or blacken them. The Sassafras is among the first to show the deep dyes of scarlet and crimson. Earlier in the season, while the leaves were deep green, clusters of dark blue fruit, supported by fleshy red pedicels, made it one of the most attractive trees in the woods or in the garden. It becomes a good-sized, shapely tree, and is handsome and fragrant the entire year, and it is quite free from insect depredators. The only difficulty we have to encounter in its cultivation is its liability to sucker, but with a little oversight it is easily kept under subjection. The Sumachs, of which we have several species, are all aglow, of course. *Rhus copallina*, the dwarf

Sumach, shows bronze-purple leaves surmounted with large panicles of crimson fruit, while *R. typhina*, the Staghorn Sumach, has bright scarlet leaves and yellow downy stems, with crimson fruit; like the Sassafras, this plant, too, suckers badly in cultivation. The Poison Sumach, *R. venenata*, is handsome in the distance, with whitish fruit hanging in slender, drooping clusters beneath the rich color of its leaves.

The Sweet Gum, or Liquidambar, is resplendent with varying shades of color. Some of the trees have bronze-purple or rich chocolate-colored leaves, others take on deep crimson and scarlet hues, while still others are as yellow as the Hickories, and each tree has its individual character so far as autumn color is concerned, which it maintains year after year. The round seed-pods sway on slender pedicels from the corky-ridged branchlets, and, taken altogether, it is one of our most interesting and beautiful trees at all seasons. The Sour Gum, or Tupelo, is also a handsome tree, almost uniformly with bright scarlet or crimson leaves, and it holds its bluish, sour fruit daintily on the ends of the twigs. The Swamp Maple, with red twigs and bright crimson leaves, is a conspicuous feature in all the damp places, while the soft or White Maple is one of our least attractive trees. Its branches break easily in a strong wind, and for several years past the leaves have been attacked by a fungus causing them to mature prematurely and fall early. The Oaks are still mostly a bright green color, only here and there are the leaves tipped with scarlet and crimson.

The Fringe-tree, *Chionanthus*, has been unusually handsome this season; all summer, beneath the large glossy leaves, the abundant fruit has hung in graceful, drooping panicles, which have looked like small green olives; until about a month past they have been deep purple, covered with a soft bloom. The Flowering Dogwood, *Cornus florida*, is very showy now with clusters of bright red fruit, and two species of *Viburnum* are scarcely less so, one with flat-topped cymes of dull red fruit, the other with abundant purple fruit. Many other shrubs and vines are full of fruit, which, with a little judicious handling, would make an autumnal garden more brilliant than the flowers of summer. The Holly, with its attractive foliage and deep red berries, remains all winter, as does the abundant scarlet fruit of *Ilex verticillata* and *I. lævigata*. The shining black fruit of the Inkberry, together with its evergreen foliage, gives it a place among the shrubs that are ornamental in winter, and the Bayberry, with gray fruit and partially persistent leaves, belongs in the same company. The Groundsel-tree, *Baccharis halimifolia*, is now decorated with pure white silky pappus, which remains a long time, and fairly covering it, but the contrast is almost too sharp with the brilliant color of other shrubs which surround it.

The more humble autumn flowers must not be overlooked in all this wealth of color in trees and shrubs. Great stretches of purple and gold meet the eye as it turns from the dense woods to the countless array of Golden-rod and Sunflowers, and Golden Asters (*Chrysopsis Marianna* and *C. falcata*), together with hosts of the finest species of Asters in the country. Among these are *Aster Novæ-Angliæ* in varying shades of deep purple to rose, the showy *A. spectabilis* and the stately *A. puniceus*. *A. nemoralis* and *A. concolor* are also handsome, and many more show occasional forms well worthy of cultivation.

But, after all, no garden looks more attractive than some of the groups here of Nature's own making, although, if we are wise observers, we may find hints for arranging forms and color so as to produce rich effects. For example, here is a dense background of Cedars along a sluggish stream with lower deciduous trees in front, the mass of foliage sloping downward gradually until it mingles with the dwarf Huckleberry and other shrubs of the Heath family only a foot or two in height. Imagine this belt of varying width, but always several rods across, and extending in a sinuous unbroken line along the water-course, and you have in autumn a picture of singular effectiveness.

Vineland, N. J.

Mary Treat.

Changing Fashions in Flowers.

ON a bright afternoon or evening, especially from December until after Easter, the florists' windows are conspicuous features of our fashionable business thoroughfares. In the daytime these are arranged with reference to the rays of the sun, and a walk on Broadway or some of the avenues on almost any Saturday afternoon is likely to show a judicious grouping of growing plants in the sunniest parts of the windows, with the flowers effectively sheltered among the luxuriant foliage. Some of the displays on ordinary days during the last year or two will be remembered by every one who saw them for their original and tasteful designs and their costly composition.

So common are these window arrangements that one hardly remembers they were not always a part of the florists' business, whereas hardly any attempt was made to gain attention by tasteful and striking arrangement even twenty-five years ago. Changes have occurred steadily in the florists' trade since 1830, when there were not more than a dozen horticultural establishments in the entire country, and marked characteristics of different periods could be cited. But, to begin twenty-five years ago, hardly one of the flowers now seen was then to be found in florists' collections. Fuchsias and tuberose were regular stock in trade, and, their short stems pieced out with wires, served no small part in close, motley bouquets. White abutilons and double primulas were in high favor, plants of double white Primroses sometimes commanding as much as a dollar each. The once familiar *Daphne odora* has been displaced for more fashionable blossoms, and Bouvardias, a main reliance in all floral work, are now represented only by a few of the newer varieties in small quantities. Leaves and flowers of such commonplace plants as *Tradescantia*, *Geraniums*, *Feverfew*, *Candytuft*, *Sweet Alyssum*, *Mignonette* and *Heliotrope* were among those most generally used. *Stevia* and *Eupatorium* gave something like lightness to the dense and formal bouquets. Occasionally, some enterprising growers used the stately *Eucharis Amazonica*, and *Euphorbia jacquiniæflora* and *Chorozema varium* were also sold. The dainty flowers of *Lily-of-the-valley* were seen during a short season only, until some twenty years ago, when the secret of hurrying the pips through an artificial winter, and so bringing them into flower the year through, was learned. The *Ascension Lily*, *Lilium candidum*, was the only Lily then forced in any quantity, while *Callas* were one of the most common and useful of winter flowers. Standard varieties of *Carnations*, now but a memory, were *President de Grauw*, *Flatbush*, *Snowdon* and *Peerless*, all white; the carmine *La Purité*, the yellow variegated *De Fontaine* and *Astoria*; *Hinsdale*, a fancy variegated, and *Crimson King*. Until five years before this period, the now universal practice of growing *Carnations* under glass in winter was unknown. The flowers were nipped off at the calyx, and those measuring an inch and a half across were considered of the first size. Importers of some of the first French *Carnations* seen in this country are still making the cultivation of these flowers a specialty, and to their persistent and intelligent experiments are due improvements, such as better habit of plant, firm stem, perfect calyx, clear, solid color, fragrance and keeping quality. Very few roses were sold in winter, and none of the varieties of that time are now grown for florists' use. The old apricot-yellow *Safrano*, the white *Lamarque*, with *Gloire de Dijon*, *Maréchal Niel*, *Isabella Sprunt*, *Bon Silene* and *Hermosa* were favorites. In *Violets*, *Schonbrun* and *Neapolitan* were fashionable. A larger proportion of the Dutch bulbs imported were used for forcing than now, when the most of them are planted out-of-doors. *Camellias* were the choicest of all flowers, and the most expensive bouquets contained only as many of these waxy flowers as the number of dollars charged for them. These formal, artificial-looking flowers are now quite out of the trade, and gardenias, still plentifully grown in England, have only a very limited call from travelers who have cultivated a liking for them there. A few chrys-

anthemums were sold in autumn, but they were the hardy varieties which were grown out-of-doors, and no one then dreamed that these flowers would be seen in such size and variety as now when cultivated under glass.

It must not be inferred, because a greater variety of flowers and plants are used now than a quarter of a century ago, that the business of the florist of that day was an insignificant one. Perhaps as many flowers were sold in proportion to the population then as now. In the prosperous times which followed the war, expenditures for all luxuries were lavish, and it was difficult for popular florists to secure enough flowers for the demands of their customers. A larger proportion of the flowers sold were used at funerals than now. White blossoms were universally chosen for this purpose, and not infrequently tufts of cotton tied to the regulation toothpicks were made to do duty in wreaths and crosses when enough carnations could not be had to finish the piece. This fashion of flowers at funerals at last came to be an annoyance, and on the death of a noted actor so many floral tokens of grief were sent to the bereaved family that they filled the house and flowed out over the sidewalks. Of course, such an unwise practice could not endure long in a sane community, and the excess was corrected by the notice, "no flowers," which soon began to appear in the announcements of funerals.

The change which has taken place in the material used is no greater than the revolution in the manner of arranging it. In the sixties, baskets were made solid with moss held in by a mesh of wires, into which the short-stemmed flowers were thrust. During the holidays a large basket might contain one or two heads of poinsettia, a few camellias, and perhaps some rosebuds, filled in with *stevia* and *eupatorium*, and edged with leaves of *Cissus discolor* or *Croton*. Leaves of *Begonia Rex* were also pressed into use for variety. In smaller baskets two or three camellias were used with the ordinary filling, and perhaps the bracts of poinsettias were placed regularly around the border. Snug hemispherical bouquets were constructed in the same motley fashion, with *Geranium* leaves or *Sword Ferns* for edging, and sometimes a stand of these compact affairs, stood in damp moss, was to be seen in florists' shops, the prices rated in proportion to size. As an example of the lavish use of flowers, it may be said that quite elaborate baskets, costing two or three dollars each, were not infrequently given as favors at private balls, three or four hundred of them being used on a single occasion.

The growing of Ferns as an article of commerce has developed entirely within the past twenty-five years, and this marks, perhaps, one of the most striking changes in the business. The table ferneries, now used so generally, were then unknown, and fronds of Ferns which are now indispensable in almost every floral arrangement, and which are considered sufficiently delicate to go with the most refined flowers, were never used. The change can hardly be appreciated by one who sees whole houses given up to the growing of *Adiantums* and other choice Ferns to be used exclusively for cutting. Of course, in private collections there were some choice varieties of Palms, but these plants, which are now grown by the thousand and which make the basis of display for every festal occasion, were almost unknown in the trade.

Altogether, this great change has, as a rule, been in the direction of refinement and simplicity. Instead of formal bouquets, loose, long-stemmed flowers are now used for gifts, although there seems something barbarous in the passion for mere size which is shown in giant chrysanthemums and dahlias. Nevertheless, the whole tendency is in the direction of a purer taste and a more genuine art. The formal designs are much less common, and the use of such flowers as *Coreopsis*, *Rudbeckias*, *Helianthus* and other native wildings is becoming general. Recalling the changes which have gone steadily on during the past quarter of a century, one wonders how the florists' shops will look in 1925.

New York.

M. B. C.

Foreign Correspondence.

London Letter.

ACALYPHA SANDERIANA.—This is a new species of *Acalypha* which Messrs. F. Sander & Co. have introduced from New Guinea and flowered recently in their nursery at St. Albans. It forms a sturdy bush, with ovate-acuminate dentate dark green leaves, from the axils of which are developed long finger-like, drooping spikes of rich crimson flowers, not unlike the flowers of *Amarantus hypochondriacus* (Love-lies-bleeding). It is unlike all other cultivated species of *Acalypha*, the attractions in which are those of leaf variegation. I am told by one who has seen the plant growing in the tropics that the flower-spikes are sometimes nearly a foot long, and as they are developed profusely all down the stems, a well-grown specimen when in flower ought to be both novel and picturesque. Messrs. Sander & Co. intend to include it among their novelties next year.

POLYGONUM BALDSCHUANICUM.—This is a climbing species with the habit of the common Bindweed, fleshy cordate leaves two to four inches long, and long, elegant branched panicles of white and rose-colored flowers. It is grown in the open air at Kew, where it is supported by a few pea-ropes, upon which it has formed a thick tangle of stems and leaves, and it has been flowering freely for the past two months. It stood the cold of last winter without protection, but even should it prove tender it is well worth the little trouble necessary to keep it from year to year. It ripens seeds freely and may be propagated from cuttings. For its introduction we are indebted to the late Dr. Regel, who obtained it from Bokhara, in Turkestan, about twelve years ago. In general characters it resembles *Boussingaultia baselloides* rather than *Polygonum*. A figure of it will shortly be published in *The Botanical Magazine*.

ANGELONIA SALICARIEFOLIA.—This is a pretty summer-flowering herbaceous perennial of easy culture, and suitable either for summer bedding or for cultivation in pots in the conservatory. It forms a compact little bush about a foot high, with opposite ovate-lanceolate toothed leaves about three inches long and terminal erect racemes six inches long, clothed with bract-like leaves and stalked bilabiate flowers an inch across, colored purple-blue, with a few reddish spots in the throat. It is easily propagated from cuttings, and nice plants can be grown in six months on a shelf in a warm greenhouse. This year some plants have been tried in the open air at Kew and have proved quite a success. I am told that in some parts of India this species is popular as a bedding plant. It is a native of Guiana, whence it was introduced into England about seventy years ago. *Angelonia* is closely related to *Alonsoa*.

SALVIAS.—The following half-dozen species are valuable bedding plants for autumn effect. They are propagated from cuttings struck in heat in early spring and grown on until June, when they are planted in large beds on a lawn in a sunny position, where they grow into bushes three or four feet high and develop their flowers in September. A few years ago all the species of *Salvia* obtainable were grown at Kew, and from them these six species were selected as being most suitable for ornamental gardening: *S. splendens* forms a dense leafy bush and bears erect terminal racemes of bright scarlet flowers; also a most useful plant when grown in pots with *Chrysanthemums* and brought into flower in a sunny greenhouse in October. *S. involucrata* (Bethellii), a very sturdy grower, with dark green leaves, the midrib and petiole colored red, and the erect racemes six inches long, crowded with large flowers of a rose-red color. The buds are enclosed in large bracts, forming a conical-like head, hence the name; also a good winter-flowering plant for pot-cultivation. *S. azurea* (Pitcheri) forms an elegant shrub four feet high, with linear leaves and long terminal spikes of azure-blue flowers. *S. patens*, a well-known garden plant, though not much grown nowadays; its stems are very soft, about two feet high, and the elegant spikes continue in flower for months, the large gentian-blue flowers

being most attractive. A mass of this species in a good position on a lawn is one of the most effective beds in the garden. *S. coccinea* is a sturdy grower, four feet high, with hastate, rich green foliage and erect spikes a foot long bearing whorls of bright scarlet flowers. *S. Grahami* forms a thick bush two feet high, with soft, green, apple-scented, ovate leaves and short racemes of rich carmine-red flowers. These six species grown together in a large bed produce a rich effect which continues till the frost ends them.

STERNBERGIA LUTEA.—I ought certainly to have included this in my notes on autumn-flowering bulbous plants (see page 374). It is now flowering freely in several borders here, and the rich canary-yellow of its large *Crocus*-like flowers is most pleasing. Although an old garden plant and quite hardy, at any rate in the warmer parts of England, it is rarely seen, and, even where grown, a small patch of it in the rock-garden is considered sufficient. In my opinion it is one of the prettiest and most useful of all autumn-flowering hardy bulbous plants, and if not already popular with you it deserves to be. The bulbs, which should be planted six inches deep, are like those of the Daffodil; the shining green, strap-shaped leaves are developed along with the flowers, and the flowers are erect, four inches high, the upper portion being divided into six ovate concave segments, forming a cup two inches across. The plant is common in the Mediterranean region. *Sternbergia macrantha* is as large again in flower and appears to be quite as hardy. It is still rare in gardens.

CROCUS SPECIOSUS is the largest and most attractive of all the autumn-flowering species; it is also easily established in sunny grass-clothed banks, and, unlike many bulbs recommended for such positions, it comes up year after year with increased vigor. Quantities have thus been established in the wild garden and similar positions at Kew, where for the past fortnight they have made a fine display of bright purple. Bulb growers among the nurserymen here are alive to the value of this plant, and some of them now possess large stocks of it. Another species of almost equal value as an autumn-flowering bulb of easy culture is *C. zonatus*, which has pale purple flowers as large as those of *C. speciosus*. These two species are natives of Asia Minor, where they are met with in some localities in enormous quantities. Bulb growers ought to endeavor to induce these two to throw color varieties by means of cultivation and selection from seeds.

SUNFLOWERS and Michaelmas Daisies in the Arboretum add a rich note of color in the autumn when planted in large breadths in positions where they will tell. At Kew large masses of them are grouped among the Pines, Cedars, etc., in and about the margins of plantations, and they now give life and color just where it was most needed. The perennial *Helianthus*, such as *H. maximus* and *H. rigidus*, and any of the autumn-flowering *Asters* are quite at home in such positions. They are not planted in formal beds, but in irregular groups, the ground being first broken up and manured in spring and the plants put in somewhat thickly. After this they practically take care of themselves. *Anemone Japonica* is also most appropriate for uses of this kind, as also are the *Solidagos*. *Roses* and *Pæonies* serve a similar purpose for spring effects.

London.

W. Watson.

The first frosts which bring death to much tender herbage introduce no discord into the natural landscape. There is never a greater expression of unity in nature than there is at this restful season of the year when every shrub and tree is waiting for the fall of the leaf and the silence and sepulture of winter. It is not so with most garden landscapes, for where the plants are killed outright they leave such a blackness and such a picture of death that all unity is destroyed. Last spring some *Cannas* were introduced in a park among some shrubs with exuberant, almost tropical foliage, to bring in a dash of color and differences of form, but the first frost blackened the *Cannas* and ruined the effect of the group for a full month. It is a mistake to use tender plants for massing with hardy ones. Our autumns are long and we cannot afford to have their beauty marred by any such violation of the spirit of restfulness and peace which pervades its landscapes.—Bailey.

New or Little-known Plants.

Berberis Nevinii.

OUR figure of this shrub, which is presented below, will, perhaps, serve to call attention to an exceedingly rare and little-known plant of which the fruit has not been collected, and which may be expected to be a most desirable inhabitant of the gardens of temperate countries. *Berberis Nevinii** belongs to the section *Mahonia* of the genus, and is described by Mr. Nevin, who discovered it several years ago on a sandy plain near Los Angeles, California, as a shrub seven or eight feet tall. The leaves are composed of from three to seven oblong-lanceolate, spinulose-serrate, obscurely reticulated leaflets, often nearly an inch long, and are rather shorter than the loose racemes of yellow flowers. Information with regard to this very handsome and distinct plant and a supply of ripe fruit are especially desired by the director of the Arnold Arboretum.

Fig. 54.—*Berberis Nevinii*.

Plant Notes.

BACCHARIS HALIMIFOLIA.—A large vase filled with flowering sprays of the Groundsel-tree, *Baccharis halimifolia*, was an interesting feature at the American Institute flower show last week. On the New Jersey seacoast this shrub becomes a real tree, ten or fifteen feet high, and with a trunk three or four inches through, being the only member of the great family of Compositæ which attains to this distinction in our flora. The flower-heads are not large or showy, for they have not the conspicuous ray florets which distinguish our Asters, Sunflowers and other members of the family, but they are very abundant, and since they appear in early October, when no other shrub is in bloom, *B. halimifolia* has distinct merits as a flowering plant. This is especially true of the pistillate plants, for the fertile and sterile flowers are borne on separate individuals. The fertile flowers are much the more showy with their white tufts of long thread-like corollas, and as late as December the plants are covered with a gray pappus which is quite as showy as the flowers. The Groundsel-tree takes well to cultivation, and with attention it becomes a better plant than it is in the wild state. In good soil it becomes a compact bush or low tree, and its green leaves persist until winter fairly begins.

IRIS JAPONICA.—This plant, generally known as *Iris Sinensis* or *I. fimbriata*, is an Asiatic species which has been in cultivation many years in greenhouses. It may possibly be hardy, but as it flowers in the late autumn and winter it should be grown under protection and where slight heat may be given when it flowers. This is a crested *Iris*, and is classed in the same subgenus, *Evansia*, as our native species, *I. lacustris* and *I. cristata*. It has thin, sword-shaped leaves, one foot or more long, an inch broad and somewhat lax. Strong plants produce stems furnished with many flowers, which make a true raceme. The flowers appear in succession, and are some three or more inches in diameter. In color they are a beautiful delicate mauve, very similar in tone to those of *I. cristata*. They have a distinct crest and yellow markings at the throat, and the falls are finely crisped. It is altogether a charming plant and worthy of a place in the choicest private collections. It does not seem to be always successfully grown, but Mr.

Gerard has recently sent to this office some perfect flowers. His method of culture is simple. It is reported after flowering in good sound loam, rather light, but rich, and well supplied with water as it makes growth. He gives it moderate shade, as its habit seems to indicate.

Cultural Department.

Notes on New Roses.

NO Rose in recent years has been so widely advertised and so highly praised as the *Crimson Rambler*. It has been offered for sale in every hamlet in this part of Massachusetts by the agent of some nursery firm, and every cottager has had the chance to plant the new favorite in his garden. Owing to skillful advertising and brilliant pictures it has had an unusual sale. Many who purchased it were led to believe that it would produce bouquets of a hundred or more blossoms to a shoot the first season, and they were naturally disappointed when it did not bear a solitary flower. *Crimson Rambler* is certainly a valuable introduction, but, like all new plants of merit, it has been too highly lauded. With us it has proved perfectly hardy, and a temperature of ten degrees below zero did not kill it back in the least last winter. Plants set out last year bloomed satisfactorily in June and have made excellent growth during the present season. Young plants set out in three-inch pots at the end of May now have stout shoots from three to five feet in length and ought to do well next year. Last July I saw a splendid stock of this Rose at the nurseries of the introducer, Mr. Charles Turner, of Slough, England. Two hedges of it five feet in height and of proportionate thickness were a magnificent sight. I counted shoots carrying from one hundred and fifty to two hundred and fifty flowers each, and this was in a dry season. Some growers in England have found it makes an excellent climber. At a large private place in one of the northern counties a wall twelve feet in height was for some distance covered with it and it was blooming profusely. It makes a good companion for such old favorites as *William Allen Richardson*, *Gloire de Dijon*, *Reine Marie Henriette*, *Devoniensis*, *Maréchal Niel* and *Lamarque*. The capabilities of this Rose as a pot plant were well demonstrated by the superb specimens shown by Mr. Jackson Dawson, of the Arnold Arboretum, at the spring show of the Massachusetts Horticultural Society last March. One or two florists of my acquaintance have grown batches in pots and will endeavor to have them in flower for next Easter. Nicely flowered plants ought to be in demand for that season.

Lord Penzance's hybrid Sweetbriers have had a large sale, both in America and Great Britain. They are apparently even more vigorous than *Crimson Rambler*, and the foliage of all the kinds I have grown is quite as sweet-scented as that of the old Sweetbrier. They appear to be perfectly hardy in this section, and a friend in Minnesota says they survived a temperature there of twenty-five degrees below zero. Occasional complaints were heard in England about their not flowering freely. In the south of Scotland I saw, toward the end of July, shoots of the current season's growth from six to nine feet in height, so there can be no question about their vigor. The

* Robinson, *Syn. Fl. N. Am.*, i., pt. 1., 69 (1895).

flowers are pleasing and cover quite a range of colors. The bright scarlet hips which follow the flowers are also highly ornamental. The more recent introductions of this class are specially fine. Lucy Bertram is a beautiful rich crimson with pure white centre; Jeannie Deans is crimson scarlet, semi-double, and flowers in clusters; Green Mantle, bright rich pink, with a band of white encircling the anthers, is also pretty; Catherine Seyton is a pleasing tint of rosy pink; Julie Mauvering is a lovely porcelain pink, and Minna a pure white of large size. All these are decided acquisitions and should become popular when procurable at a reasonable price.

Among the newer hybrid Tea Roses, Belle Siebrecht bids fair to become extremely popular. It was extensively planted for forcing during the past season by many of our leading Rose growers. It is too soon yet to have their opinion of its merits, but it is expected to rank high during the coming winter. Madame Abel Chatenay, sent out by Pernet-Ducher, is a new hybrid Tea of real merit. The flowers are full, the buds spiral in form, rosy carmine in color, shaded with vermillion-rose and tinged with salmon. Souvenir de President Carnot, also raised by Pernet-Ducher, is much after the style of the old Niphetos, with a stiff, erect habit. The buds are long, color of flower rosy flesh, shaded with white. Beauté Lyonnaise, from the same French hybridist, is a very large and full white Rose of stout, erect growth. The flower is slightly, but pleasingly, tinted with pale salmon. In Mr. Turner's nurseries these three Roses are being largely propagated, and are highly thought of, and they certainly seem likely to be better known in the near future. Mrs. W. C. Whitney, another comparatively new but well-known hybrid Tea, has also been generally planted this year. A few plants we have look very promising. The buds are long and of extra-large size; the flowers are of a beautiful cream-pink shade, and they hold their color well in winter. Those who handled it last winter speak highly of Mrs. Pierpont Morgan, and it has received certificates wherever shown. It is a sport from Madame Cusin, but is a much stronger grower than the parent and produces larger flowers, which are of an intense rose-pink shade, with a rich Tea fragrance. I recently saw a bench of this variety which showed remarkable vigor. It is said to be a profuse bloomer, even in the duldest winter months, and it ought to be a decided acquisition.

Marchioness of Londonderry gives promise of being a high-class hybrid Perpetual. It has made vigorous growth here during the past season and has not mildewed at all. It is a welcome addition to the white-flowering section. Clio, which is something after the style of the ever-popular Baroness Rothschild, also seems likely to be valuable. The flowers are flesh-color, shaded rosy pink toward the centre. Marchioness of Devonshire, satin-pink in color, is also good. Two of Dickson's new varieties, Helen Keller and Mavourneen, as seen last July, are very fine. The first-named is a beautiful rosy cerise color, while Mavourneen is a delicate, silvery flesh-white, shaded with rose. Both are said to be of vigorous habit. Mrs. R. G. Sharman Crawford has not made very good growth here. This Rose is of a rich rosy pink shade, the centre petals pale in color and white at the base. None of the newer introductions approach Mrs. John Laing in all-round excellence. It is a fine autumnal bloomer, and every shoot has a flower on it. Here it has given us many fine flowers during September. It is much to be regretted that so few Roses of the hybrid Perpetual class give us any flowers except for a couple of weeks in June.

Taunton, Mass.

W. N. Craig.

Flower Garden Notes.

OWING to protracted rains, the outdoor garden is less attractive than we ever remember to have seen it at this season. Asters, Boltonias, Silphiums and Pyrethrum uliginosum, which ought to be making a superb display, are but a sorry spectacle, and the only really bright thing we have is the Scarlet Sage, *Salvia splendens*, and a few Zinnias. These were planted where the first frost could not touch them, and it is surprising how much influence neighboring trees can exercise in keeping off the earliest frosts that usually blight the tenderest plants.

It has not been safe in past years to lift plants or roots from a permanent border in the autumn months; there are so many things that are invisible above the soil at this season, that it is wise to defer thinning out until spring, when all are appearing above ground. If, however, it is desirable to add plants to make losses good, or, even to remodel altogether, it is always best to do as much as possible now before the soil loses its warmth and while it is well moistened down to a good depth.

As soon as all border plants have died off or turned yellow, so that they can be cut down, we shall add the annual top-dressing of well-decayed leaf-mold, putting it on to a depth of at least four inches all over the beds. This makes a good protective covering as well as a fertilizer, and brings in far fewer weeds than stable litter. At this season it is economy to save every leaf that can be gathered and heap them for future use; it takes two years for them to decay thoroughly, and a turning over once or twice a year will materially hasten the decomposition. If lime be not present in the natural soil of the locality, it will be well to add it to the heap as it is turned over; it will also help the process and add to the value of the whole as a fertilizer, but care must be taken not to use any of the compost for Ericaceous plants, such as *Rhododendrons*, *Kalmias*, *Ericas*, *Andromedas* or other allied plants, for lime is poison to the roots of all such. Many have found how difficult it is to cultivate these plants on a limestone formation. In this section no limestone is in the rock formation, so that an application of lime is a help to soils that are under cultivation for any length of time.

We have already lifted and replanted all the *Narcissus*-bulbs. This was the year to separate the clumps that had been growing larger than was good for the best results, and all have been replanted again. It is not too late to do this work now, but it is not safe to defer much longer, because the roots are in active growth soon after the fall rains set in. A light mulch over all when planted will keep out a lot of frost and induce a strong growth this fall, which will greatly improve the display next year, besides acting as a fertilizer for such annuals as are used in the borders.

Some recent exhibits of *Salpiglossis* before the Massachusetts Horticultural Society have enlightened many as to their value for summer-border use; there seems to be a great advance made lately with this beautiful annual. It is also a mistake to plant the seeds in the greenhouse, for the young plants do not like transplanting, and thrive well when sown where they are to bloom; the colors are very beautiful in the softness and delicate marking. The *Salpiglossis* is among the best of garden annuals for house decoration when the flowers are cut and used in vases, and they last well.

Any plants that are needed for propagating, if herbaceous, should be lifted soon and stored in boxes in cold frames until March, when they may be put into a warm greenhouse and cuttings made of the young shoots. Most herbaceous plants root freely in this way, and soon make strong plants to set out in spring. This is the best way to increase the finer forms of garden *Phlox*, *Veronicas*, *Helianthus*, *Campanulas*, *Lychnis* and the like.

Bulbs of tender plants must be taken up as soon as the tops are browned by frost; *Gladioluses*, *Cannas* and *Montbretias* may be laid out to dry for a few days before storing in the winter quarters. We put the *Gladiolus* corms in bags and suspend them in a cool cellar; *Cannas* seem to need a warmer place. A temperature never less than forty-five is best suited for them, or many will be lost from damp and decay.

South Lancaster, Mass.

E. O. Orpet.

Some Little-known Plants.

COREOPSIS ROSEA, a pretty little native species, has been in flower in this garden for the past six weeks. It grows about a foot high, with branching stems and opposite linear leaves from one to two inches in length. The flowers are some half an inch in diameter and freely produced if it has a sunny position in the hardy-plant border. It is a perennial and easily propagated by seeds, flowering the first year if the seeds are sown early in the greenhouse and the young plants grown on.

Tylophora aristolochioides is a rapid-growing twining plant, with opposite oblanceolate leaves from four to six inches long by two wide. It is a native of Japan and belongs to the Milkweed family. It has not yet flowered in this garden, but if it proves hardy it will make a useful plant for climbing porches, etc. *T. sublancoolata*, var. *obtusata*, is a diminutive twining plant, growing only about two feet high, with small opposite leaves and cymes of small, brownish purple flowers. It is also a native of Japan. Both species do well in a sunny position, but of the two species *T. aristolochioides* is by far the better.

Hydrocotyle Asiatica is a low-growing umbelliferous plant, with leaves so like the common Violet that the plants are often mistaken for Violets. The flowers are inconspicuous, being very small, dull pink in color and almost sessile on the creeping stems. If it proves hardy, which is not probable, it may be used with good effect in some positions in the rock garden. *H. moschata* is a much more diminutive species, growing

only about three inches high, but it forms a perfect carpet of its pretty leaves, which are also reniform, but with lobed edges. It is a native of New Zealand, and of the two species I consider this one the better.

Calandrinia longiscapa is a Chilean species of this genus. It grows to a height of eighteen inches, with branching stems. The fleshy leaves are opposite, oblanceolate in outline, three inches long by one and a half wide. The small pink flowers are borne on rather long terminal panicles, and, like other members of the Purslane family to which it belongs, opening only in bright sunlight. After flowering it produces small, globular, scarlet seed-vessels, which are rather attractive.

Cucubalus baccifer is a trailing plant with stems a yard long oppositely branched at intervals of two inches, each branch

blue color inside, and white outside. The shape of the flower differs from the Pea in having the petal called the standard below instead of above. It is easily propagated by seeds.

Coronilla scorpioides is a low, straggling annual with stems a foot and a half long. The almost sessile trifoliate leaves are alternately disposed on the stems. The leaflets are ovate, the terminal ones larger than the side leaflets, being one inch long by three-quarters wide. They are glaucous and of a bluish green color. The small yellow flowers are borne on short peduncles in the axils of the leaves. They closely resemble the flowers of *Scorpiurus*, and the fruit has a tendency to mimicry of some insect, as *Scorpiurus* does. It is a native of Persia, and is easily raised from seeds sown in the open border.

Basella rubra is a trailing plant belonging to the Goosefoot family. The leaves are somewhat fleshy, oblanceolate in outline, three inches long by two wide. The flowers do not apparently open, but the little pink buds, which are disposed on small spikes, sessile in the axils of the leaves, are very pretty. Though it does well in an open position in the hardy plan-border, it is a very pretty subject for a hanging basket in a warm greenhouse. It is a native of India, where it is known as Malabar Nightshade. It is readily propagated either by seeds or cuttings.

Stachytarpheta Indica is a shrubby annual belonging to the Vervain family, and grows about two feet in height. The oblong lanceolate leaves are three inches long by one and a half wide with coarsely serrated edges; they are blotched with a peculiar bluish green color, which gives the plant a somewhat distinct appearance. The small, deep blue flowers are on spikes about six inches long, and continue nearly all summer. It is a native of the West Indies. *S. mutabilis* is a much coarser-growing species, with large opposite leaves four to six inches long by three wide. The flowers are borne on terminal spikes; they are also small, but of a rosy pink color. The plants do not flower till October, and if grown in the open border they must be lifted and placed in a warm greenhouse to flower; at least, this is our experience with the plant. It is a native of South America, and Nicholson's *Dictionary of Gardening* says "the leaves have been imported into England for adulterating tea-leaves." It is synonymous with *Verbena mutabilis*.

Edward J. Canning.

Botanic Garden, Northampton, Mass.

Asplenium ebeneum.

THIS is one of our most attractive Ferns at this season when the foliage about it drops away and the dainty fronds which have been half-hidden through the summer are again unveiled. We sometimes find them by the roadside in a tangle of Brier or other wayside shrubbery, but always on high ground, in light soil, in proximity of rocks and stones. There is no mistaking this Fern for any other species or variety, for botanical limitations of dimension are closely followed. The fronds are from nine to eighteen inches high and rarely exceed or reach the width of an inch. The stripe is black and glossy and the fertile fronds very erect.

If the arrangement of the auricled pinnæ seems too precise, this defect is counterbalanced by the graceful spread of the curving sterile fronds around the base of the plant. For indoor culture through the winter this Fern is excellent, whether grown in pots, boxes or under glass. It especially delights in birch-bark baskets, and is much more attractive when thus arranged; but, in any case, the roots should be placed against small stones and native soil supplied if possible. Plants for cultivation must be intelligently selected, for if the indusia have discharged their spores, decay of the fronds is but a natural sequence; if, on the other hand, the indusium is intact, such fronds may be relied upon to hold their own until new fronds appear in early spring. But if all the fronds are broken off, after a little rest entire new growth will appear, which, if lack-



Fig. 55.—*Cedrus Atlantica*.—See page 412.

being about six inches long. The almost sessile leaves are opposite, lanceolate in outline and slightly hairy. The flowers are borne singly on short peduncles, with petals small and white, but a pretty cup-shaped, persistent calyx, which makes them attractive. It is a native of northern Asia and belongs to the Pink family.

Clitoria heterophylla, although a native of the tropics, does well planted out in a partially shaded position, and has been in flower for the past month in this garden. Like many of the Leguminosæ to which it belongs, it is of low, straggling habit. The leaves are all pinnate, alternately disposed on the stems. The leaflets are small, and, as the specific name indicates, of two forms, some being round, while the others are best described as panduriform. The flowers are of a beautiful azure-

ing in the stamina given by open-air exposure, far exceeds such growth in grace and delicacy. Overwatering is disastrous, and it must always be borne in mind that in the cultivation of Ferns but little water is needed, except in the case of Bog Ferns.

Under glass, *Asplenium ebeneum* is counted among standard Ferns; so secure is it of this position that it indulges in all manner of freaks. A branching rachis is not uncommon, and fronds appear with the pinnæ of *A. Trichomanes* promiscuously intermingled with its own. The collector must be cautious if he would preserve his specimens unbroken, for brittleness is a marked characteristic of *A. ebeneum*, especially of the fertile fronds.

Pittsford Mills, Vt.

G. A. Woolson.

Correspondence.

Fertilizers for Orchards.

To the Editor of GARDEN AND FOREST:

Sir,—Will you state in your journal what is the best fertilizer for Apple-trees. I have no adequate supply of stable-manure, and must buy chemicals.

Bloomfield, N. J.

A. R. B.

[No categorical answer can be given to questions of this sort unless one has definite information about this particular orchard upon such points as the character and condition of the soil, whether the trees are young or old, vigorous or feeble. Every fruit grower, and, indeed, every farmer who uses commercial fertilizers, ought to know something of the general principles which underlie the use of these substances. It should be understood that Apple and other orchard fruit trees need certain mineral elements, and since they grow slowly they can be treated with such substances as leather waste, horn refuse, tobacco-stems and other slowly decomposing manures; but, of course, in the application of such manure, and, indeed, of any manure, some definite system must be followed. No better fertilizer for fruit-trees can be used, as a rule, than one part of muriate of potash and one and a half parts of ground bone. Wood-ashes or cotton-hull ashes may be used in place of the muriate to furnish potash if they can be cheaply obtained. Manures which are highly soluble will be probably washed out of the soil before they are all utilized by the tree, and, therefore, large applications of nitrate of soda are not to be used. It should be remembered, however, that the soil should be in good mechanical condition—that is, not too open nor too compact, not too wet nor too dry—if any fertilizer is to have its best effect. Above all, never apply any fertilizer whatever until you have looked at the whole subject with sufficient care to enable you to devise some intelligent system which can be persisted in. In *Farmers' Bulletin No. 44*, issued not long since by the Department of Agriculture, Professor Voorhees states clearly and succinctly some of the foundation truths in regard to fertilizers which every cultivator ought to know. One who carefully follows the directions here laid down is not likely to commit any serious error.—Ed.]

Two Rare Ferns—*Asplenium Bradleyi* and *Trichomanes radicans*.

To the Editor of GARDEN AND FOREST:

Sir,—I went, early in July, to the place where Professors Shaler, Procter and Hussey camped for three months while making the survey of Edmonson County, Kentucky, in 1875. I wanted to note any changes in the flora since Professor Hussey's report was made, and I found many. The forests, when he wrote, were much older than the so-called "barrens" of the neighboring counties, especially of Barren County, as once they had escaped the forest-fires kindled elsewhere by the Indians. In the deep gulches cut by Nolin and Bear Creeks, the extremes of heat and cold are greatly modified, and protection is furnished to many species of plants not found elsewhere. Most of the larger trees are now being rapidly cut for cross-ties, and the ridges following Green River and its tributary streams have been denuded of their many large Chestnut Oaks, Chestnuts, Tulip and White Walnut trees, and still the work goes on. This, of course, has affected the undergrowth. Along the wooded road on top the sandstone ridge I find only

a few plants where I expected many, and under the cliffs the change is noticeable.

It is in this part of Edmonson County, on both sides of Nolin River, that the new, or rather the European, *Mullein*, *Verbascum phlomoides* (found, so far as known, nowhere else in the United States) made its appearance two years ago. It is being rapidly exterminated by the officers of the experiment station. One noble rock—Dismal Rock—is over three hundred feet high, a grand perpendicular wall with a seam or crevice not over three feet wide at the top and less than six inches at the base, open as clean as if cut with a knife. Its base is covered with the Umbrella Tree, *Kalmia* and a few large Hemlocks and Jersey Pine. On the face of the rock were fine plants of *Asplenium montanum* and a few *A. pinatifidum*.

The point of interest to me was the place where Professor Hussey for the first time in this state found *Asplenium Bradleyi*. I found it in Warren County in 1892. It was still growing there, under a high projecting rock at the head of one of the small streams. I counted more than fifty plants, though I could not bring myself to gather more than two or three roots, and, perhaps, a hundred fronds. Many of the plants are dead, and I think the days of the others are numbered.

The forests near have been so cleared out, the land up to the ravine on either side is now in cultivation, and it seems only a question of time when many of the Ferns here will disappear. This rare Fern is scattered over the face of the high cliff, from base to summit. Its only companions were *Asplenium Trichomanes*, in numbers, and *A. pinatifidum*. I gathered the last mentioned and *A. Bradleyi* from the same crevice, their roots interlocked.

I found a fine lot of *Trichomanes radicans* in Warren County this summer, growing under a sandstone cliff in constant moisture, and also found it in Edmonson County in three different places. There were but few plants growing at these latter places, however, and I presume these, too, will soon disappear. The loss of shade about its favorite haunts will, no doubt, prove fatal. It is a beautiful object, growing under a cliff, often in darkness, with the moisture trickling through the rocks, each point of leaflet and bristle bearing a tiny drop of water, like a miniature yellow diamond. The Ferns in company were *Asplenium Trichomanes*; a Moss (not yet determined), while above it grew *Dryopteris marginalis* and an occasional *Asplenium pinatifidum*.

Bowling Green, Ky.

Sadie F. Price.

The Forest.

The Burma Teak Forests.—XI.

VALUE OF PROFESSIONALLY TRAINED OFFICERS.

THE idea of using the flowering of the Bamboo in order to form Teak plantations I had long entertained, but the credit of having started this work upon a large scale belongs to Mr. Berthold Ribbentrop, the present Inspector-General of forests in India. In speaking of military officers I have purposely dwelt upon the excellent work done under good guidance by men who had not had the advantage of a special professional training. This was in the early days of forest administration in India, when the work was of a more simple nature and when professional questions had not attained prominence. After I had completed seven years' work in Burma and had during three years more endeavored to promote the development of the work in other provinces, I came to the conclusion that further progress was not possible without the introduction of men with a thorough professional training. I will not detain the readers of GARDEN AND FOREST by an account of the manner in which I succeeded in overcoming the objections which at that time were raised nearly on all sides against this measure. As stated in a late article in this paper, I obtained permission to organize a system of professional training of a number of young Englishmen to be sent out annually—some to be trained in France, others in Germany—and I succeeded in securing the services of two young forest officers from Germany, Dr. Schlich, the author of the excellent *Manual of Forestry* repeatedly noticed in the pages of GARDEN AND FOREST, who succeeded me as Inspector-General of Forests in 1883, and who is now at the head of the Coopers Hill Forest School, and Mr. Ribbentrop, who had worked under Forest Director Burckhardt at Hanover, one of the most eminent foresters of the present century. Working in the spirit of his great teacher, Mr. Ribbentrop, succeeded in devising cultural operations intended to increase the proportion of Teak in the forest in a variety of ways, among others by dibbling in Teak-seed in places where the Bamboo had flowered. These operations have been steadily continued, and now form some of the

measures regularly adopted in order to improve the productiveness of the Burma Teak forests.

FUTURE YIELD OF TEAK PLANTATIONS.

In 1894 the following areas had been stocked with Teak on plantations and by means of cultural operations. Under toungya plantations the figures here given include a certain area (2,701 acres) on which Teak was planted, mixed with Cutch (*Acacia catechu*). The areas planted with Cutch pure (366 acres) have been omitted, since the present communication is intended chiefly to give an account of the Teak forests:

Regular plantations,	3,996 acres.
Toungya plantations,	31,287 "
Cultural operations,	3,723 "
	<hr/>
	39,006 "

The annual yield of these areas will eventually constitute an important addition to the yield of the natural forests. What has been stated will have made it clear that these areas, when mature, will not be stocked with pure Teak. Bamboos and other trees will spring up and will form an important constituent of the mature forest. But even where Teak may predominate in the growing stock, as will be the case in regular plantations established in places easy of access, where cleanings could be more regularly attended to, they will occupy narrow belts, mostly surrounded by other forest. As these plantations advance to maturity it may with certainty be expected that while the Teak will spread from self-sown seed into the neighboring forest, other kinds, especially such as stand shade, will spring up among the Teak-trees. Nor is it desirable that these plantations should grow up as pure Teak woods, for, as a rule, the Teak does not attain perfection in pure woods. In the above figures, however, all areas which contain less than forty per cent. of Teak have been excluded.

It will be remembered that the most recent researches regarding Teak grown on the hills of Pegu under the régime of annual jungle fires, have established the age of a tree six feet in girth to be between 134 and 156 years. In plantations, however, from which fires are kept out, the growth is quite different, it is much more rapid, and we are justified in the assumption that the present plantations will, at the age of ninety years, carry, in addition to Bamboos and other trees, sixty mature Teak-trees per acre, each tree yielding seventy-five cubic feet of timber. Thus, if thinnings are excluded from the calculation, the mean annual yield of successful plantations, continuously protected against fire, may be estimated at fifty cubic feet per acre. As already stated, on a limited area Teak and Cutch have been planted together, and otherwise it may be doubted, whether the whole area will come up to this standard, but even if we only estimate an average yield of thirty cubic feet per acre, the 39,000 acres artificially stocked with Teak up to June, 1894, will furnish 23,400 tons a year, or more than one-third of the Teak timber extracted annually during the five years ending with June, 1894. And these plantations and cultural operations are being extended steadily. In 1893-4, 4,134 acres were planted, which, when mature, at thirty cubic feet per acre, may be relied upon for an annual yield of 2,400 tons. It has in a previous portion of this paper been explained, that while during the last five years in the natural forests 20,300 trees a year were girdled on an average, the Teak timber extracted annually during the same period amounted to 68,000 tons; further, that after special working plans shall have been prepared for all forest districts, it is expected that 40,000 trees a year will be girdled. Thus, eventually the natural forests alone may in their present condition be expected to furnish twice the present annual timber output. And to this will, in course of time, be added the yield from plantations which, if operations are continued as at present, will soon equal the yield of the natural forests.

THE FUTURE YIELD OF THE FORESTS WILL BE INCREASED BY PROTECTION AGAINST FIRE.

But apart from plantations and cultural operations, the natural forests are capable of great improvement. It has been stated that the area protected from fire in the reserved forests of the British Indian Empire amounts to one-third of the whole. In Burma the work of fire protection is much more difficult than in other provinces, and of the 6,374 square miles of reserved forests in lower Burma it has not yet been possible to protect from fire more than 8½ per cent. The protected area is increasing steadily, but slowly. As it increases the soil improves, less seedlings are destroyed and a smaller number of large trees are damaged by the fires. True, Bamboos and other trees profit equally, but with the special care bestowed upon the Teak, that tree profits more and the result eventually will

be a larger annual yield of Teak timber from the same area. On several occasions in these pages the Karens have been mentioned as the most important inhabitants of the forests of lower Burma. Their villages teem with children, and under the strong and just British Government their numbers increase steadily. When the reserved forests were demarcated, certain areas were assigned to them in each forest district, sufficient to furnish forest for their shifting system of toungya cultivation, and calculated liberally, so as to provide for an increasing population. Many of these Karens are employed in planting Teak on their toungyas, and thus they contribute materially to augment the future yield of the forests. The present yield of the natural forests under the special working plans made within the last twelve years amounts to seventeen tons girdled annually upon a thousand acres, or to less than two cubic feet per acre. As fire protection is extended, as larger areas are planted, this insignificant yield per acre will eventually be a thing of the past.

Bonn, Germany.

Dietrich Brandis.

Exhibitions.

Flowers and Fruits at the American Institute Fair.

UNDER the direction of the Farmers' Club there is now in progress an exhibition of fruit and vegetables and flowers in connection with the American Institute Fair at Madison Square Garden, in this city. During last week the leading flowers shown were Dahlias, and a large collection of the best varieties was contributed by such experts as Mr. W. P. Peacock, of Atco, New Jersey, who showed more than 2,500 blooms, which in the main were in admirable condition, and deservedly took the first prize. In almost all the classes for these flowers the Rev. C. W. Bolton, of Pelhamville, New York, a well-known amateur, was second, and the Horticultural Department of Cornell University showed 213 varieties which were particularly interesting botanically. The leaves showed a wide variety in form and color, some of them being cut almost as fine as a Fern-leaf, and others showed tints of bronze and maroon. Dahlias have always been flowers of pure color, but until the single varieties and the so-called Cactus forms were introduced there was an artificial and rigid look about them which was not winning. The time seems to have come when we may expect great changes in the character and habit of both plants and flowers. Many of the latter now show petals singularly rolled or arranged loosely after the fashion of Japanese Chrysanthemums, and they are more gracefully borne on long stems. The variety Clifford W. Benton, for example, a yellow flower of full Cactus form on tall arching stems, seemed as unconventional as Chrysanthemums of the best type, and some of the pink ones show a clearness and purity of tone which no Chrysanthemum of this color has yet attained.

In spite of the lateness of the season a large collection of unusually good *Gladiolus* was exhibited by John Lewis Childs, Floral Park, besides something like a hundred varieties or more of hardy flowers. A bank of decorative plants on the stage contained many fine specimens sent by Messrs. Siebrecht & Wadley and Richard Brett (gardener to J. B. Colgate). An unusually comprehensive display of vegetables was shown, one collection of tomatoes containing eighty different varieties. Grapes made the leading feature of the fruit display, and, except a few of the very early sorts, nearly every variety in cultivation here was shown. Mr. C. C. Corby, of Montclair, took the first prize, and Ellwanger & Barry the second, in this creditable display. Mr. D. M. Dunning, of Auburn, showed some magnificent clusters of European grapes, and Mr. William Parry astonished visitors with twenty distinct varieties of chestnuts grown on his place, including all the improved forms. Many of these were in the burs, which were of enormous size and showed wide diversities of form, weight, color and flavor. Mr. Parry's collection also included walnuts, native and foreign, filberts and many other nuts.

This week the space will be largely devoted to apples, but the labeling and staging are not yet completed as we go to press. There is little doubt, however, that in size and quality the display of apples will excel anything of the kind hitherto seen in this city.

Notes.

The leaves of *Tricyrtis hirta* seem to be disfigured less than usual this year, and whenever they escape this rusty look the plant is altogether desirable. The curious purple-spotted flowers, with their six-leaved perianth and conspicuous three-cleft style spotted in the same way, are interesting and truly beau-

tiful when closely examined, although they make little show at a distance. This *Tricyrtis*, or Toad Lily, as it is sometimes called, is perfectly hardy, and it likes rich soil and partial shade.

Mrs. Wilhelmina Seliger writes in the *Hartford Times* that if the berries of the Mountain Ash are dried they will keep well all winter and make a very good variation in the diet of pigeons and domestic fowls of all sorts. Poultry are very fond of them.

Frosts are shortening near-by supplies of the more tender vegetables, and peas and string-beans are already coming from Virginia and South Carolina to supplement northern crops. Field mushrooms from western Pennsylvania sold on Monday for fifty cents a pound, and the cultivated product, of more compact substance, for \$1.15.

Campbell's Early Grape receives nothing but commendation, so far as we know, from all who have tried it in widely different parts of the country. Its good qualities seem to be hardiness of vine, healthiness of leaf, large bunches and good-sized individual berries with a thin but very tenacious skin, which helps them to endure transportation well.

Professor Halsted writes, in relation to the Asparagus rust of which we spoke on page 394, that from the replies elicited by his circular this disease is probably confined to a few localities, although future reports may show that it is doing damage on a wide scale. It is worth while for observers to make a careful examination of Asparagus beds in every section of country to see whether or not they are infested. In any case, it is important to burn over every infected field before this destructive disease is more widely disseminated.

The last number of *The Southern Farmer* publishes an illustration of a dewberry which is called Austin's Improved. It is certainly of the largest size, and is said to be not only very prolific, but of the most tempting flavor. The berries seem three times as large as a specimen of the Early Harvest blackberry, which is photographed on the same plate, and it may readily be believed that the blackberry is of the average size, if the statement is correct that fifty-three of these berries quite filled a quart box. The berries were grown at Pilot Point, Texas, by J. W. Austin, and we should like to have them tried in a more northern latitude.

Mr. Charles H. Shinn writes to *The Independent* that a large beet-sugar factory has just been established at Salinas, California, and some thirty thousand acres of land there will be devoted to this crop. There are three other factories in the state, two of them very large, and the land devoted to beets in thirty or forty acre tracts last year is said to have yielded farmers about \$40 an acre profit. There are large areas of land in California which have been mapped out by the agricultural department of the university of that state as profitable for beet culture, and the advantages offered for this industry in California are principally a long working season and a high sugar percentage in the roots. Fuel, however, is not cheap, and water is not always abundant. If California is to produce enough beet sugar to supply the present demand of the United States, it will require 1,840,000 acres of land to furnish beets for 460 factories, each with a working capacity of 350 tons of roots a day for the season, and, directly and indirectly, employment would be given to half a million persons.

As illustrating changes of vegetation, Mr. Hemsley, in *Knowledge*, refers to the rugged island of St. Helena, with its area of 38,000 acres, rising 3,000 feet above the Atlantic, at a distance of 1,000 miles from Africa and nearly 2,000 from the nearest point of the American continent. When discovered it was entirely clothed with forests, but the hogs and goats which were left on the island to provide food for chance visitors multiplied to such an extent that they destroyed the vegetation, or, at least, prevented the seedlings from growing. The island was not botanized until the beginning of the present century, when some of the native plants had probably disappeared already, and in 1875 an account of the flora showed that less than half a dozen of the sixty-five known species of indigenous flowering plants and Ferns collected at the beginning of the century were actually extinct, but, with the exception of a few scattered individuals, the remains of the original flora were high up on the central and inaccessible mountain ridges of the island. Of trees which once covered hundreds of acres only a few individuals, and in some cases only a single example, remained. Large areas once covered with vegetation were bare, since the rains had washed the soil from the rocks. Other parts had been completely possessed by introduced plants from various parts of the world, among them many British species, the common Furze being the most abundant shrub. Among the trees the British Oak was the most thor-

oughly naturalized, growing to a great size and producing acorns in profusion, and the Scotch Fir and other conifers had been planted to the extent of two hundred acres, so that the whole surface of the island has been completely altered, and many of the original plants will soon be extinct because they succeed nowhere else in a wild state, and in cultivation they are difficult to preserve.

Not even excepting apples, no fruit is at present seen in our markets in so large variety as grapes. Five-pound baskets of large-berried Concords cost but fifteen cents, while twenty cents is the price for the same quantity of Delawares and Catawbas, and Niagaras command twenty-five cents. Of thirty-six car-loads of California fruit sold here during last week the greater part was Muscat, Black Morocco, Black Prince, Cornichon and Flame Tokay grapes; these sell for from sixty to seventy-five cents a basket. Almeria grapes, the first of the season having been offered last week, cost twenty cents a pound. Gros Colman and Muscat grapes, grown in hot-houses in this country, sell for \$1.25, and the handsomer fruit of the same varieties, from England, for \$1.75 a pound. Selected Jamaica oranges retail for thirty to sixty cents a dozen, medium-sized grape-fruit for \$1.00, and handsome smooth-skinned limes, as large as a medium-sized lemon, are seen in the best fruit-stores, for twenty-five cents a dozen, ordinary small ones costing ten cents. A few large shaddocks recently came from the West Indies, but there is little demand for this pink-fleshed fruit, which, though juicy, is lacking in flavor. Tangerines, from the same islands, cost seventy-five cents a dozen. The last Bartlett pears, firm and well-colored, bring fifty cents to \$1.00 a dozen, and Comice pears from seventy-five cents to \$1.50 a dozen, according to size and quality. Baskets of Maryland peaches holding thirty fruits may yet be had for \$1.00, the same price asked for somewhat smaller baskets of Salway peaches from California. Extra-large specimens of this western fruit find buyers at seventy-five cents and \$1.00 a dozen. Spanish melons cost twenty-five to forty cents each; persimmons, from Florida, fifty cents to \$1.00 a dozen; prickly pears, from Italy, fifty cents a dozen. The Chinese Lychee nuts cost twenty-five cents a pound. Plump, fair-sized chestnuts from New Jersey, bright and of rich color, sell for twenty-five cents a pound, and very large cultivated nuts from the same state for fifty cents a quart.

A correspondent of *The Country Gentleman* explains how any one who lives in a village or city where a sunny space three feet square is available can have fresh strawberries of first-rate quality in their season. The outside of a strongly bound barrel is marked into four-inch squares, an inch hole is bored in the centre of every alternate square corresponding to the black squares in a checkerboard. Well-enriched garden soil is placed in the barrel to the level of the first row of holes, and then Strawberry plants are inserted through the holes, with the roots rather higher than the stems to allow for settling, when more soil is put in and firmly packed. This layer is then sprinkled with water and the process is continued until the barrel is filled with soil and a plant is set in each hole. An ordinary linseed oil barrel will contain about 135 plants. The barrel should be set on a box, or something to lift it above the ground, so that the foliage can be sprinkled occasionally and insects kept from the berries. The barrel is covered to prevent the escape of moisture, and in watering the plants a few holes are made through the soil with a stick and water or liquid-manure is poured in as the plants need it. They can be set in spring, or if this is done as late as August a fair crop will be borne the next year, and this will be repeated four or five years without renewal. Three or four bushels to a barrel is an average crop of berries, and five bushels is the maximum, although the yield depends on the variety and management. In winter in localities where there is a low temperature a light covering of straw should be thrown over the barrel. Sharpless and Crescent—that is, a combination of pistillate and bisexual plants—do well, and so do Bubach and Marshall, and other varieties will undoubtedly flourish. The berries will do fairly well in partial shade, although, of course, a sunny place is preferable. Since no runners will grow, the strength of the plant goes more directly to the fruit, and clean berries are secured without any trouble of cultivation or weeding. The Strawberry barrel is highly ornamental at any season, and particularly so when the plants are in bloom and in fruit. We have never seen this tried, although we have often heard of it and should like to have the result of some one's experience. It is said that some nurserymen have been selling barrels furnished with plants for six or eight years, and more than one thousand of them have been sold in New York state, many of them in Brooklyn.

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Park Lands and their Boundaries.

IN a late number of the *New England Magazine*, Mr. Charles Eliot gives an outline sketch of the park system of Boston and its adjacent cities, with a map showing the reservations proposed and actually made for this metropolitan district. Within a radius of eleven miles from the State House there are thirty-seven distinct municipalities, containing a population of a million and property worth a thousand million dollars. Of course, some of these communities have parks of their own, and they have acquired land for securing a pure water-supply, but it became plain to thoughtful people that without coöperation of the different towns and cities the time was at hand when all the water-front along the rivers or the sea, and all the broad areas of woodland or meadow which would be desirable for public use, would be built over or appropriated for business purposes. The wise plan was, therefore, devised of establishing a metropolitan park commission. In addition to the parks of Boston, Quincy, Cambridge, Lynn and others already existing, this board has selected a dozen other sites for some peculiar fitness of their own or because they are necessary to supplement the others and connect them into a system; and the map now shows that there is no part of the district which is not provided with open spaces and parkways according to its needs. We have had occasion, hitherto, to speak of the singular wisdom displayed in choosing certain of these reservations for special purposes. Twenty minutes from the heart of the city there is a curving beach of sand three miles long and fronting the open sea. This splendid beach is now free to the people, while on the high ground behind it is a driveway from which there is to be a clear view eastward, since every obstruction between it and the shore is to be removed. The Charles River is to be turned into a water parkway. The Blue Hills reservation, five miles long, takes in the highest land and the most impressive scenery in the entire district. The Lynn Woods contain two thousand acres of picturesque forest land. The Middlesex Fells, the Hemlock Gorge, the Waverly Oaks, Stoney Brook, are all particularly valuable in themselves and for their position to furnish outing grounds to the growing population of Greater Boston.

These reservations were not selected by chance, nor

were they taken here and there because some one had land to dispose of, or because some association of property-owners clamored to have their district recognized. A comprehensive and well-balanced system was carried out because professional advice was taken at the outset—that is, just when it was most needed. In an early volume of this journal the fact was recalled that when Messrs. Olmsted & Vaux planned Prospect Park, they suggested that the ocean beach ought to be made the terminus of a great parkway which should take Prospect Park in its course, and then, sweeping through the rich country behind what was the city of Brooklyn and linking together a chain of small parks, be thrown across the East River from Ravenswood and carried into Central Park and onward to the north through a system of sylvan roads, or across the Hudson from the head of Riverside Drive over a bridge which is sure to come, to be connected with the heights of Bergen, the Palisades and the Orange Mountains. This magnificent scheme could have been carried out for a reasonable sum and made complete by the year 1900, and even then, with all the park-land subsequently acquired, our park area, in comparison with our population, would be less than that of London now is.

Our cities are increasing in population more rapidly than the country, and there is more need of public parks every year. But we are beginning to realize that these open spaces are quite as necessary to the life of a civilized city as its school system, or a good water-supply, or art galleries or libraries. There is likely, therefore, to be less trouble in securing the land now, even though it is much more costly than it was twenty years ago. The danger is that the grounds will be selected by men who have given no thought to the interests involved, and who do not realize how complicated a matter it is to provide for the varied wants of a great population. It is not enough to appoint a commission of worthy citizens who begin their work with a cloudy notion that about so many acres are needed for recreation-grounds, and who then set themselves to adjusting the claims of rival east-side and west-side associations or up-town or down-town interests. An individual park ought to be an organized work of art. A system of parks requires still more study if it is wisely adapted to the varied wants of all classes and all ages, with facilities for every form of outdoor recreation.

Just here the example set by Boston should be a model for every city. Professional advisers were appointed before an acre was bought. They were consulted not only in a general way as to the selection of park sites, but, after making a complete study of the whole question, they selected the sites and worked out their boundary lines. In this city we have several so-called parks in the annexed district which are not yet parks in any sense of the word, but simply areas of land which are to be at some time converted into parks. No study has been made of those lands, and when they were purchased the shape of the territory was a matter of slight consideration. No doubt, a careful examination of any one of them would show that some half-dozen acres adjacent to, but outside of, its present limits would be worth ten times as much as many another area of the same size within the park. No cursory examination of land, even by a skilled park-maker, is adequate to solve questions like this. What any park boundary ought to exclude and include can only be determined after long and serious study. The fundamental mistake here was made in purchasing this land before expert counsel was taken. There is no need of haste in constructing our new parks, but certainly if they are to serve their highest purpose some attempt at designing should be made before the surrounding property multiplies in value. It ought not to be forgotten that after the land for Central Park was purchased, the approaches at the Fifth and Eighth Avenues, which were essential to give some dignity to its entrances, had to be secured at enormous expense, and very costly, too, were the blocks added at the northern end of the park, which were found necessary to the

completion of the design. Certain it is that the topographical survey of these parks ought to be delayed no longer, for contour maps will be needed before even an intelligent study of them can begin.

New York is not the only city which has committed this fundamental error, and the mistake will be repeated over and over again until it is understood that a large part of the usefulness of a public park depends upon the selection of its site, and that a park with a well-chosen site, and with boundaries intelligently defined, is half-designed. It is an unpleasant fact that there are but few skilled park-makers in the United States, but if one can be secured by a municipality which is about to provide itself with public pleasure-grounds, no counsel of such an artist can be of greater use than that which he gives before a foot of land is bought.

Is Indian Corn Growing Wild in America?

MANY years ago researches were made to establish the fact that Maize belonged exclusively to this country, and was of American origin. It was believed in 1837 that the plant in its wild state was extinct, and thus one of the strongest arguments to prove it indigenous was lost. No evidence could be found in Europe, Asia or Africa to show that the plant existed prior to the voyages of Columbus, in 1492, or Pizarro, in 1498. Both of these navigators saw it growing, and we have now reason to believe that the Indians and Incas made use of the grain many years before these visitors arrived. We have corn that has been preserved for several hundred years, and it may have been grown over a thousand years ago. In a dry state this grain appears to be indestructible, and I have in my possession some Peruvian corn that is certainly several hundred years old; it is dry and friable, is of a red color, and yields a white meal. It was buried with a so-called mummy prior to the year 1555, and how long before history does not tell. Peruvian corn was in small ears, from three to six inches long, and bore grains pointed on the top, not in rows, but somewhat imbricated. It was evidently far removed from the wild stock.

Primitive Corn, or Wild Corn, which has been found in several different regions of this continent naturally reproducing itself, has a character of growth that fits it for long preservation in a mild climate, although, if planted and cultivated a few years, all the characteristics of wildness gradually disappear. The cobs of Wild Maize are thin and hard, covered with lines of mushroom-shaped elevations, each having a wire-like pedicel growing from the top, attached to a glume enclosing a small pointed grain, or a flat grain smaller than any pop corn. These kernel-husks overlap each other toward the point of the ear, like the shingles on the roof of a house. The imbrications are largest and longest at the butt of the ear, and gradually become less pronounced as they advance in distinct rows to the point. The individual glumes are from an inch to two inches long, and are much longer than this where the grains are not fertilized, particularly if the entire ear is of this character, as is proved by a specimen in my collection. Over these imbrications is the outside husk as we have it in all cultivated Corns. Of course, the barn and the corn-crib soon make winter protection by the glumes unnecessary.

Originally there may have been but one variety of Corn, and it was attached to a mild climate; but, judging from analogy and the effects of cultivation, we are of the opinion that there were subvarieties, and in them the grains were of a different color and the glumes striped. The Incas and Indians had different varieties of Corn, and grew ears of several colors, some uniform and others mixed, but their cobs were thin and sometimes the ears quite short. Six varieties of the Wild Corn found growing in infrequented localities have been described, five of which I have seen, and several of which have been grown. All have pedicels attached to the glumes, and the glumes imbricated.

The word corn, in many languages, simply means

grain. Indian corn is Indian grain distinctively, as the Indians had no other. They had beans, squashes, pumpkins, gourds and melons, but wheat, rye, oats and barley belonged to the Old World, and had to be imported. The Indians grew Corn over a wide range of country and wherever the climate was adapted to it.

Cultivation has done wonders with this grain both in its form and color, so that now we have, perhaps, a hundred varieties. The plant varies from a foot and a half to fifteen feet in height, and the ears from two inches to sixteen inches in length. We find in modern Indian growths ears that are of a uniform gamboge-yellow, white, black, blue and red, besides mixed colors. We have also several varieties of Pop Corn, Sugar Corn and Field Corn. Most of the Corn grown by Indians is in small rounded grains, except that of the Cliff-dwellers, who appear to have been, in a measure, an agricultural people. Their cobs were thin and their grain in rows, but the individual grains were larger and square-ended. Indented Corn seems also to have been known among them.

Every people must have a drink, and if the process of distillation is unknown they resort to fermentation. Primitive American races made a drink out of corn, analogous to beer, by fermentation of the ear in its green state or after it had dried. This was intoxicating to a certain extent, but, fortunately, much less so than the modern distillate from the same grain. The drinking-mugs of the Cliff-dwellers bear testimony to their having had this habit. Great improvements have been made by the white race in growing this cereal, and one of the chief of these is in the diameter of the cob, which has been made to hold as high as twenty-four rows. From four to six ears have been grown on one stalk, and ears produced of very remarkable length. Sugar Corn was introduced in 1779, and now it and Pop Corn have entered into the race, and larger varieties are being produced. The commercial variety known as "Turkey Corn" is not a Maize, and does not bear its grain on an ear, but on the top, in the tassel, as the Broom Corn does. Turkey Corn is about eight feet high and bears a small, rounded grain, which is either white or pinkish; in the east it is known by the name of Dura. The Turks and Egyptians grow Indian Corn, it is true; but it was originally obtained from America. Turkey Corn and Maize have often been confounded by botanical writers. "Blé de Turquie" is a distinctive grain.

Indian Corn in its wild state has been found in Arizona, southern Texas, the valley of Mexico and Central America. Rocky Mountain Corn I have known a long period of time; it has very small ears. Corn has been found growing wild in the valley of Mexico, and one of the professors in the University of Mexico has been experimenting with it, and has the engraving of a plant which grew about five feet high. Wild Corn has also been grown at the Landreths', near Bristol, to whom it was sent from Arizona. The last I have seen was found by Dr. Williams, of Houston, Texas, when on a hunting expedition in the southern part of that state. It is a white flint of fair size, and fifteen stalks have only produced four ears, which grew on two of the stalks. The plant is a very vigorous grower, but it is not productive, and eight stalks grown in Texas did not produce a single ear.

Philadelphia, Pa.

Robert P. Harris.

[Indian Corn with glumes to each kernel is not rare. Usually, when this is planted, something like fifty per cent. of the ears produced have kernels without husks, which fact suggests that it is a sport or strain of ordinary Field Corn. If Maize has been found naturally reproducing itself where it could not have escaped from cultivation or have been produced from dropped seed, this certainly is a most interesting fact—a fact so important, indeed, that botanists will feel inclined to scrutinize the evidence closely before adopting the view that this Wild Maize is a survival of the prehistoric form, and not a reversion of cultivated Corn toward the primitive type.—Ed.]

Reforestation Waste Lands in Holland.

THERE is a society in Holland called the *Nederlandsche Heide Maatschappij*, with objects similar to those of the New Jersey Forestry Association, with an official bi-monthly organ. It is encouraging to those interested in similar societies in America to know that the *Heide Maatschappij* and the similar society in Denmark, after which it was modeled, have been successful in many respects. It is also gratifying to learn that even in Europe a great deal of what has been accomplished is due to societies similar to the state associations of the United States. The objects of the Holland society are to promote the exploitation of the dunes, heaths and other desert places, to give advice, form nurseries, and sell trees at cost price, to educate the people in the principles of forestry by distributing literature and by delivering lectures and to encourage the Government to improve the waste land which it owns. It has a membership of two thousand. Every member pays two gulden annually, but there are many honorary members and patrons who pay much larger sums for its support. This association has already accomplished a great deal. It has induced the Government to continue the work of foresting the dunes, for which twenty thousand gulden have been already appropriated for experimental purposes, and the work is under the direction of the society, and two nurseries have been formed in which many seedlings for dune planting are grown. This association has induced individuals to improve their waste lands, and contemplates buying and improving heath land for example sake. The society is under the directorship of Mr. H. J. Lovink, an able and enthusiastic forester.

The Dutch dunes are similar to those of New Jersey, and unless the soil is covered it is shifted by wind and wave. More than four thousand acres of land in the neighborhood of the town of Bergen is owned by the Government. This is very much like the dune land near Avalon, on the Jersey shore. There are residences surrounded by large trees in the lee of the Dutch dunes, but everything has been planted, even the famous forest between The Hague and Scheveningen, the Atlantic City of Holland, and it will cost the Government at least two hundred thousand gulden to plant its dune lands in forest. Many private holders in this region are not in favor of this work, some preferring to see it in its unproductive state, mainly for hunting purposes. The principal game, however, is rabbits, and their extermination has been decreed because they are very destructive. Thirty years ago experiments were begun by the famous geologist Staring for the planting of the dunes, but the work was frowned upon and discontinued; the trees which he planted still remain.

In the eastern and southern parts of Holland there are vast stretches of rolling heath lands, a continuation of the *Luneberger Heide* in Hannover, which stretches through Schleswig-Holstein and Denmark to near the *Zuyder Zee*, in Holland. The soil is sand and gravel, mainly glacial drift, in which may be seen irregular ice-worn pieces of rock from the Scandinavian Peninsula. There are reasons for believing that at one time this region was in part forested. The names of places in old Dutch often mean forest or wood, and Mr. J. H. Schober, the pioneer of heath planting in Holland, found part of the trunk of a large oak buried deep in the ground in his plantation at Schovenhorst. A few sheep can live upon the scanty herbage, and as soon as a little humus forms on the surface it is removed by the peasants to mix with manure. The beating force of winds and rains has compacted and leached the surface soil. Low Heather and crisp Lichens cover the ground, reminding one of the sterile fields in southern New Jersey. It is even more barren than the fire-swept plains of Ocean County, in that state. With work, this whole heath can be reclaimed. The huge experiment which Mr. Schober has had the patience and patriotism to begin proves that trees will grow there. A careful working and a little enrichment of the soil are all that are

needed at first. When Mr. Schober began his plantation at Putten forty years ago it was all a desert heath. Conifers from all parts of the world are growing there luxuriantly, and, although his experiments will not be complete for years to come, they show, at least, that a great variety of conifers will grow on the heath-lands of Holland, and that certain species are, of course, much better adapted to the soil and climate than others. Many tests must be made before conclusions as to the very best varieties are warranted. Mr. Schober has planted also large quantities of Scotch Pine, from which he receives a revenue. This wood is cut and carefully sorted, and the poles are shipped to the Belgian mines. What surprised me most on this remarkable plantation was to see species from the Rocky Mountains and the Atlas Mountains thriving in these heath-lands. The most beautiful trees in this large pinetum, as I saw them, were *Abies nobilis* and *Cedrus Atlantica*.—[An interesting account of this remarkable experiment, written for this journal by Mr. Dana, will be found in vol. viii., p. 442.—Ed.]

A great deal of private planting has been done in Holland with very little encouragement from the Government. In the southern part there are large areas in Scotch Pine and coppice Oak. The Willow has been planted in immense quantities along the Lek, the Rhine, the Maas and Waal. In the sandy heath regions much of the soil has been improved by planting one of the Lupines, *Lupinus luteus*, a beautiful plant which may be useful in America as a green manure, since it seems to flourish on very sandy soil. The American Locust, *Robinia pseudacacia*, is a favorite tree here, since it grows well on poor soils, and it is quite the custom to plant it along railroad embankments. It is also a favorite shade-tree in many German cities, and, when properly trimmed, it has few equals for the purpose. Our Wild Cherry, *Prunus serotina*, also seems to thrive on the heath lands.

Amsterdam, Holland.

John Gifford.

Foreign Correspondence.

Notes on Orchids.

DENDROPHYLLAX FAWCETTII.—An importation of this Orchid is advertised for sale by Messrs. Sander & Co., and is described as resembling *Angræcum Fournierianum*, with snow-white flowers. It was first introduced to Kew from Jamaica in 1888, and flowered in a stove in November, when it was named by Mr. Rolfe in compliment to Mr. Fawcett, the Director of the Botanical Department at Jamaica, who found it in the Cayman Islands. It resembles *Dendrophyllax funalis* (*Angræcum funale*) in having no leaves, the long, flexuose green roots performing the double duty of absorption and assimilation. The flowers are borne on long peduncles and are two inches across, the large bilobed lip being pure white and the narrow sepals and petals greenish white; the spur is slender and about six inches long. As a botanical Orchid this is of quite exceptional interest, for, although there are several other Orchids that never produce leaves, this is the only one with flowers of any attraction.

SCHOMBURGKIA THOMSONIANA is described in a sale advertisement as "undoubtedly the finest in the genus. Twenty blossoms, like a cream-colored *Lælia purpurata*, with a black-maroon lip, being borne on a spike." It was named and described by Reichenbach in 1887 from a plant flowered in England, its origin being unknown. In the year following it was sent to Kew by Mr. Fawcett, who found it in the Cayman Islands along with the *Dendrophyllax*. In general characters it resembles *S. tibicinis*, but is smaller in all its parts; the flowers are about three inches across, the segments narrow, wavy and colored creamy yellow, darker toward the apex; the lip is three-lobed, the side lobes folded over the column, the midlobe oblong, very wavy and colored rich purple. This plant shares with its ally the reputation of being difficult to flower under cultivation. Now that it has been introduced in quantity, we may discover how to treat it, so as to get it to flower freely

CATTLEYA ELONGATA.—This is the correct name for the plant introduced and distributed in 1892 under the name of *Cattleya Alexandræ*. It is now in flower at Kew, and I have seen other cultivated examples of it in bloom, but so far none with more than four flowers on a spike, although I have seen wild specimens showing ten flowers on a scape. It belongs to the same group as *C. guttata*; indeed, many look upon it as a variety of that species, differing only in the color of its flowers, which are yellowish brown, with a rose-purple lip. Several named varieties are recorded—namely, *elegans*, with larger, brighter-colored flowers than the type, and *tuberosa*, with darker-colored flowers. As a garden Orchid it is inferior to such forms of *C. guttata* as *Leopoldii*, *amethystoglossa*, etc. It requires the heat of a stove when making fresh growth.

CYPRIPIEDUM CHARLESWORTHII.—This is a first-class garden Orchid, deserving to rank among the best half-dozen *Cypripediums* known. It grows freely, is easily kept in health, blooms with moderate freedom, and its flowers are distinct, elegant in form and beautiful in color. There is sufficient variety in the color of the flowers to keep up the interest of collectors and give zest to the cultivation of newly imported plants. Traders know the importance of this quality, even in Orchids of the commonest character. It accounts for the ready sale of newly imported plants of *Dendrobium nobile*, *Cypripedium insigne*, *Odontoglossum crispum* and similar "barn-door" kinds, and if the vender can add that the plants are from an entirely new district so much the better for him. Probably no Orchid shows such range of variation in the size, form and marking of its flowers as *Odontoglossum crispum*, next to it, perhaps, coming *Cattleya Trianae*. On the other hand, many Orchids vary comparatively little.

VANDA CŒRULEA.—Large importations of this beautiful *Vanda* were distributed in England a year or so ago, and consequently its glorious flowers are now a prominent feature in collections, and even in the flower shops in the West End of London. I have seen some exceptionally fine varieties lately; we have one at Kew, the spike of which now carries seventeen flowers, each over four inches across, the segments wide and almost imbricating, and the color a beautiful pale blue, richly tessellated with a darker shade of blue. A plant of similar character was sold at the auction rooms lately for twelve guineas. Good varieties make the inferior ones look very poor in comparison, and yet I have never seen one that was not really handsome. For the cultivation of *V. cœrulea* less heat is needed than for most *Vandas*. We grow it in a moist corner of the *Cattleya*-house close to a door, where it gets plenty of ventilation. Some successful cultivators recommend the conditions of an ordinary vinery for it. As a rule, the plants grow well and flower annually for about five years after they have been imported; after that they get weak and flower poorly.

DENDROBIUM PHALÆNOPSIS.—The number of plants of this *Denbroke* that have been imported into England during the last five years is probably in excess of that of any other Orchid in the same period. And yet more are announced for sale, Messrs. F. Sander & Co. intending to offer seven thousand newly imported plants of it next week. This firm alone have imported over one hundred thousand plants of this *Dendrobium*. It is generally supposed that tropical Orchids are going out of favor, but the sale this ultra-tropical plant has commanded would appear to disprove this. No *Dendrobium* requires a higher temperature during its growing season—May to August—a hot, steamy atmosphere and plenty of sunlight being essential to the full development of its pseudo-bulbs. It is, moreover, superior to all other species from New Guinea and neighborhood in its good behavior under artificial treatment. Growers of cut flowers for the London market have secured quantities of it, finding that its long, elegant spikes of beautiful flowers fetch a high price, coming as they do at a time when they are most useful, namely from October to March.

London.

W. Watson.

New or Little-known Plants.

Rhamnus crenata.

THIS shrub, which is a native of Japan and central and northern China, I found in Japan in the autumn of 1892, growing near the Nagascendo, the great mountain road of central Hondo, near the village of Agamatsu, and on the Pine-barrens near Gifu, where it is very abundant on sterile soil with stunted plants of *Ilex crenata* and *Juniperus rigida* in the shade of *Pinus Thunbergii*. It is an unarmed, erect, glabrous shrub from six to ten feet in height, with stout branches, thin light yellow-green, oblong or oblong-obovate, wedge-shaped leaves from two to four inches in length and from one-half of an inch to an inch and a half in width; minute orange-colored umbellate flowers, and abundant black fruit half an inch in diameter. Plants in the Arnold Arboretum, raised from seeds which I gathered in Japan, have proved perfectly hardy in exposed situations and on cold wet peat soil; they are now nearly five feet high, and flowered abundantly last spring, the flowering specimen which is produced in our illustration, on page 425 of this issue, being taken from one of these cultivated plants. The fruiting branch is from a specimen gathered near Gifu.

*Rhamnus crenata** has proved a useful shrub in the Arboretum, and if it fruits as freely here as in Japan it will be decorative in the autumn. As a flowering plant it is not showy. The foliage, however, is lustrous and of a pleasing color, and has not been attacked by insects or disease.

C. S. S.

Cultural Department.

The Flower Border in Autumn.

THE white-flowered *Anemone Japonica* is an old and well-known plant which deserves a place in every collection of hardy herbaceous perennials. It delights in a rich, moist soil, where it produces its large, pure white flowers in great abundance from early in September until cut down by frost. This, with other varieties of the type, is well adapted for planting near the coast, and the long, graceful stems and good-keeping qualities render the flowers very useful for cutting. North of this city it ought to be grown in pots, since the frost too often catches it when out-of-doors. It then makes an admirable plant for greenhouse or piazza decoration in autumn.

Boltonia asteroides is one of the indispensable plants for early autumn when large and impressive specimens are desired. Its loose, graceful branches form a dense bush in well-established plants, which are literally smothered with Aster-like flowers, pure white with yellow disk. This is a noble plant for a background, as it grows four feet high when staked or tied up, but this support should not be obtrusive. Lower plants may be set in front of it; in any case, the branches should be allowed to spread naturally and gracefully. The flowers are useful for cutting, and the plant will thrive in any garden soil, but delights in moist places along streams, and is well adapted for planting near the coast. *B. latisquama* is another native of our western states which grows somewhat stronger and has purple-pink flowers a little larger than the preceding; its habit of growth is the same.

Funkia subcordata, the white Plantain Lily, another favorite of old gardens, is the best of all the Day Lilies, with bold foliage and large, pure white flowers which everybody associates with late summer in the garden. Very attractive are the spikes of glittering flowers above the shining green foliage, and yet it is not as common as it once was. Why does the young generation of gardeners neglect it?

Caryopteris Mastacanthus, so much talked about lately, proves perfectly hardy here, and a plant of three years' standing is a marvel of beauty at this season with its profusion of soft sky-blue flowers. The plants are very vigorous, and young ones set out in spring form dense bushes in one season and produce flowers from midsummer until cut off by frost. It is strange how slowly a good plant makes its way into general cultivation. GARDEN AND FOREST, as I remember, described

* *Rhamnus crenata*, Siebold & Zuccarini, *Abbild. Akad. Münch.*, iv., 146 (1843).—Maximowicz, *Mém. Acad. Sci. St. Pétersbourg*, x., 18.—Franchet & Savatier, *Enum. Pl. Jap.*, i., 182.—Franchet, *Nov. Arch. Mus.*, sér. 2, v. 73 (*Pl. David*, i.).—Forbes & Hensley, *Jour. Linn. Soc.*, xxiii., 128.
Frangula crenata, Miquel, *Ann. Mus. Lugd. Bat.*, iii. 32 (*Prodr. Fl. Jap.*) (1867).
Rhamnus oreigenes, Hance, *Jour. Bot.*, vii., 110 (1869); viii., 312.

this one as long ago as in 1888 and kept recommending it for years before any inquiry was made for it.

Nothing is more striking in autumn than a few plants of *Gaillardia grandiflora* distributed through the herbaceous bor-

until frost, and their long stems make them excellent for cutting. *Gaillardias* will grow and flower profusely in any good garden soil.

The perennial double Sunflower, a form of *Helianthus mul-*



Fig. 56.—*Rhamnus crenata*.—See page 424.

der or set in masses by themselves. The rich coloring of crimson and gold is to be seen in no other hardy plant at this season. The flowers are quite large, measuring from three and a half to four inches in diameter and continue to open

tiflorus, is still unexcelled among plants which flower in mid-summer and early autumn. It will grow anywhere, making a dense bush four feet high, and its rich golden flowers are borne by the hundred. *H. orgyalis* is a distinct and stately Sunflower,

eight or ten feet high, with long lanceolate leaves and rich golden flowers of medium size, which open in great abundance along two-thirds of the length of the tall stem. It is one of the best of the single Sunflowers for cutting, and it is indispensable where tall-flowering plants are needed.

A neat and distinct little border plant is Lady Larpent's Plumbago, which forms a prostrate tuft eight inches high, covered with rich dark blue flowers in close terminal heads, and lasting until cut off by severe frosts. It spreads by wandering roots, and in time a few plants will carpet a considerable space, and the leaves turn late to most brilliant colors.

The Giant Daisy, *Pyrethrum uliginosum*, is now found in almost every garden, and its large, white composite flowers, with yellow disks, completely cover well-established plants. These grow in any soil, but they delight especially in one that is moist and rich, where they become four or five feet high and quite as broad.

Sedum spectabile, another old-fashioned border plant, has fallen into neglect in many gardens, but early this fall I observed a mass of charming pink flowers, backed by a sombre green. It was something of a revelation to be reminded once more that this Sedum was so attractive and that it filled a place which no other hardy herb can occupy.

Riverton, N. J.

Wm. Tricker.

Hardy Plants for Forcing.

MANY hardy shrubs and herbaceous plants make interesting subjects for decoration during winter and spring, and such as have been planted out for the summer should now be potted in readiness for their winter quarters. It is not necessary to place these plants in the greenhouse at once, and the shrubs should be kept in cold cellars or pits convenient to get at, and frequently aired, even in frosty weather. It is better to keep them frozen, for all such plants force better if they have been thus kept. They should not be subjected to sunshine until they are required for forcing. The most successful growers of Lilly-of-the-valley freeze the pips continuously for a week before they force them.

Roots of deciduous shrubs and hardy bulbs can be kept in boxes out-of-doors as well as under cover. It is necessary, however, that boards be placed under the boxes to prevent contact with the earth, or the contents would freeze into a solid mass. Those who have neglected these precautions have had reasons to regret the error. For protection, hay or pine needles are excellent. It need hardly be suggested that the ground should be marked with stakes, so that plants may easily be found when covered with snow.

Desirable plants for these uses include *Spiræa astilboides* and the *Astilbes*. *Deutzia gracilis*, Lilacs, Hybrid Roses, Ghent Azaleas and hardy *Rhododendrons* are better kept under cover. Evergreen herbaceous plants, such as Foxgloves, Canterbury Bells and Christmas Roses, must be kept in frames and aired during bright weather.

Wellesley, Mass.

T. D. Hatfield.

The Acacias.

A FEW years ago even the most common Acacias were unknown or ignored by American florists. Such beautiful species as *A. armata*, *A. Drummondii*, *A. longifolia* and *A. Riciana* are now becoming quite common and popular, and many well-grown plants, especially of the two first-named species, may be seen at their flowering season in the windows of most progressive florists. That the Acacias can be grown as well here as in Europe is quite evident, and there are, perhaps, no spring-flowering plants deserving of a more general cultivation for indoor decorative purposes, whether in the florist's shop or in the home.

Aside from their value as ornamental plants in the north, the Acacias are undoubtedly destined to play an important part in southern landscape-gardening, although the tendency in the south at the present time is to introduce plants familiar in the north which are unsuited to the climate of most southern states. Most Acacias are evergreens, but they by no means require excessive heat; many species will, on the contrary, stand several degrees of frost without injury, and some of the deciduous species, such as *A. Farnesiana* and the nearly related *A. Julibrissin*, are perfectly hardy in this latitude. Nothing can be more graceful and attractive than large specimens of the Silver Wattle, *A. dealbata*, with its masses of yellow globular heads of flowers and finely pinnate silvery and downy leaves. Large specimens of *A. Drummondii*, so frequently met in conservatories, give an idea of the beautiful scenery which it would be possible to create in southern latitudes by

the judicious planting of the best species of Acacias in connection with other subtropical plants.

All Acacias do well in a sandy, fibrous loam mixed with peat or leaf-soil. As a rule, they require abundant water during the growing season, but will afterward thrive if kept moderately moist and cool. For propagation both seeds and cuttings are used with advantage. The cuttings made with a heel of half-ripe wood should be inserted in a bed of clean silver sand, without bottom-heat, in a cool greenhouse. They root freely, and should be firmly potted immediately after rooting. During the summer-time both old and young plants do best in the open air in a cool frame without glass, where they can be partially shaded and thoroughly watered as required. In the south, small twigs simply broken off and placed in the soil will root as readily as Willows in the north. Here they thrive in sandy and sterile soil, provided it retains the necessary moisture in summer.

Among the best species, both for indoor culture in the north and for more extensive planting in the south, are *Acacia armata*; leaves replaced by oblique, rounded phyllodia close to the somewhat winged and spiny branches; flowers yellow, in axillary globular heads. *A. dealbata*; leaves twice pinnate, soft, downy and silvery on the under side; flower-heads yellow, in ample racemes in summer. This species grows to a considerable size. *A. Drummondii*; leaves small, twice pinnate, leaflets linear; flowers in cylindrical spikes, yellow, in spring. *A. lineata*; leaves small, linear; flowers in axillary globular heads, bright yellow. *A. longifolia*; leaves rather long, flattened, tri-nerved phyllodia; flowers in cylindrical axillary spikes, yellow. *A. Riciana*; leaves linear; flowers yellow, in small globular heads, forming ample drooping masses at the end of short side-branches; a very beautiful and graceful species.

Newark, N. J.

N. J. Rose.

Notes from the Santa Monica Forestry Station.

Stauntonia hexaphylla.—This beautiful Japanese climber is succeeding well with us at Santa Monica. Our specimen was planted in the spring of 1894, being then only a few inches high. Trained on wires it now covers a space about ten feet by twelve feet, and is growing rapidly, though almost directly exposed to the strong sea breeze which prevails here all summer. Its digitate foliage is very handsome, with oval, acuminate, somewhat irregularly undulate leaflets, ranging from one to five inches in length, the mature ones deep green, while those of the new shoots are of a beautiful bright shade. The delicate, creamy, pendent flowers, about half an inch in length, are borne in few-flowered axillary racemes in April. If the specimen here is typical, the name *hexaphylla* is rather a misnomer, for the leaves are mostly three, five and seven foliate, five and seven predominating on the mature wood. Diligent search is necessary to discover a six-foliate leaf.

Eucalyptus ficifolia.—Our bright scarlet-flowered specimen of this very fine tree is now in full bloom, and shows to wonderful advantage against a background of *Eucalyptus polyantha* (the gray form). The heavy mass of soft glaucous gray of the latter sets off charmingly the stiff, dark green leaves and the great clusters of bright red blossoms which cover the entire crown of the *E. ficifolia*. The variety here is a full month later in blooming than the type, which is already quite past its bloom. *E. ficifolia* is regarded by many as the most beautiful of the numerous *Eucalypti* represented here. Its regular, symmetrical habit, rather pyramidal form, cinnamon-colored bark, large, ovate-lanceolate, pointed, dark green, coriaceous leaves, brilliant red flowers and remarkable, heavy clusters of large, ovoid seed-capsules combine to justify amply the eagerness with which it is sought after for ornamental purposes. It is not a tree of large growth, and it is reported as not exceeding fifty feet in height in its native forests. At Santa Monica it has done well in a mean winter temperature of about fifty degrees, Fahrenheit, with the thermometer occasionally registering as low as thirty-four degrees on the sheltered terrace in the cañon where the trees stand. Of our five specimens the best is a double-stemmed tree twenty-three feet high, with a spread of sixteen feet. The others are somewhat smaller. This represents a growth of seven years from the seed, without irrigation, and with an average annual rainfall not exceeding fifteen or sixteen inches; last winter it was less than eight inches. As an avenue tree and for ornamental purposes generally, in suitable climates, and as a highly desirable greenhouse species in colder regions, *E. ficifolia* has many claims to consideration.

Eucalyptus calophylla.—This tree, closely related to the one just described, is also blooming freely now. This species has been described recently in GARDEN AND FOREST by Mr. Wat-

son (see p. 364), from a specimen grown under glass at Kew. His description tallies well with the appearance of the trees grown in the open air at Santa Monica. It may be added, however, that the seed-capsules are larger and even more remarkable than those of *Eucalyptus ficifolia*, though more sparsely borne. They are some two inches or more in length, an inch in diameter, rudely goblet-shaped and slightly constricted at about two-thirds of their length from the peduncular end. The outer integument on the dry capsule is gray-green, hard and rough. Underneath this is hard, brown, fibrous tissue, which takes a polish almost like brier wood. These pods make excellent pipe-bowls, and can be utilized also for umbrella-handles and the like. The species endures several degrees of frost and grows more rapidly than *E. ficifolia*, with which it may be ranked for ornamental purposes. As to more general utility, reports from Australia ascribe considerable value to the timber, which is said to be hard, close-grained and finely veined.

Santa Monica, Calif.

John H. Barber.

Notes on Watsonias.

MY experience with *Watsonias* has been confined to a few of the species. I have not tried the new variety offered this year by Messrs. Wallace & Co., and spoken of so highly by Mr. Watson in the issue of GARDEN AND FOREST for October 7th, but if I find it no better than most of such as I have grown I shall not value it highly. *Watsonia Meriana* and its varieties are too much like *Gladioli* of a poor strain to be worth growing more than once, and *W. humilis* is not much better, though the aspect of the bulbs with their coarse-fibred coats is of some interest, as is the firm, rigid foliage, which in some species is spirally twisted. These bulbs are not very free-flowering unless they are kept much warmer during their season of rest than is necessary with *Gladioli*. There is, however, one species of the *Gladiolus*-leaved series which is worthy of a high place among flowering bulbs, namely, *W. angusta*. It makes a spike of exceedingly brilliant scarlet flowers about two inches or a trifle less in diameter. The tint varies a little in different individuals, but all are beautiful. I lost the few I had some years ago and have not been able as yet to get a fresh supply, some form of *W. Meriana* being furnished instead of the true species. Of the smaller-flowered section I have grown only one species, *W. aletroides*, a kind of lower and slenderer growth, bearing a spike of rose-colored flowers, a little tinged with purple at the tips. These flowers are nearly cylindrical and drooping and remind one somewhat of *Lachenalias*. I was surprised to find this species hardy. It came up and flowered yearly until, through my own neglect, it was smothered and killed by *Witch Grass*. One more species only I have grown, *W. fistulosa*, ranked by Mr. Baker as a *Micranthus*. This is an interesting species, but not handsome enough to be worth keeping long. Its foliage consists of erect, round hollow leaves, and the flowers are very small and crowded in the spike. The specimen which I had was blue-flowered, not red, as Mr. Baker describes it.

Canton, Mass.

W. E. Endicott.

California Irises.—Failure to establish *Iris Hartwegii*, *I. Macrosiphon* and, perhaps, other California Irises, has been so general that it will interest gardeners to know that Herr Max Leichtlin has lately taken them in hand and solved the problem of their successful cultivation, so that now "they grow like weeds" in his garden. He says that "plants are received in Europe from their native quarters quite fresh and healthy-looking, but I have treated such plants several times and they always died. My experience is that they cannot be successfully moved unless they are in full vegetation. We must grow them from seed and not touch the seedlings before they have formed a solid root-stock; after this, and when movement to again grow has begun, they can be safely handled and transplanted like other Irises; in May in Baden-Baden. They want sunny quarters. This spring I had plants with twelve or twenty flowers open at one time in all shades of ochre and cream. They are very striking plants."

Elizabeth, N. J.

J. N. Gerard.

The Japanese Wineberry.—This plant, *Rubus Phoenicolasius*, which has lately been the subject of much notice, is a most useful addition to our fruits, even in its present form, and it is reasonable to hope that it will improve considerably under cultivation. It prolongs the berry season, and producing comparatively small seeds, it is superior to blackberries and raspberries for canning, preserving, wine and jelly. It is also hardy, ornamental and prolific, and is subject to attack from few diseases or insects. During the past season it came into

full bearing after the main crop of raspberries had been marketed, and in New York city, where the fruit was previously unknown, it readily brought ten cents a quart to the growers.

Floral Park, N. Y.

M. Barker.

Correspondence.

Along our Roadsides.

To the Editor of GARDEN AND FOREST:

Sir,—It is quite a general custom among many of our property owners to attempt to beautify our roadsides by going over them with scythe and axe, shearing everything close to the bank, or, perhaps, leaving a straight row of trees a certain distance apart, whose matured size will encroach on the road or, perhaps, interfere with the telegraph-wires, and eventually subject them to the pruning butcher. This shearing treatment of roadsides, with the firing that is often practiced, must exterminate many of our native plants, or, at least, banish them from places where they are most desirable. After three years of judicial pruning and trimming of the roadsides here around the Pitcairn estate we are highly gratified with the growth and variety of plants which are now covering them. On one side of the road *Sassafras*, *Cornus florida*, *Viburnum acerifolium* and *V. dentatum* are spreading, the latter especially desirable, being a compact shrub, with erect branches about eight or ten feet high, with large cymes of white flowers which are followed in the autumn with bright blue fruit. The Sheep-berry, *V. prunifolium*, is also very plentiful and desirable. *Prunus serotina*, *P. Virginiana* and *Celtis occidentalis* have attained a height of four and five feet from mere shoots a few inches high two summers ago. The showy *Rhus glabra* is establishing itself very freely. *Rubus Canadensis* and *R. villosus* have made a wonderful growth, and I find many waste places along the roadside where they are invaluable.

Among the Roses, *Rosa lucida* is the most plentiful, and masses of it can be found fifty feet in length. Plants of the Sweetbrier are abundant, as is also *R. Carolina*. *Sambucus Canadensis*, although common, is one of the best of shrubs. But of all the plants for bank covering none can compete with *Lonicera Japonica*. Although it is not a native plant, it has become established here, and even threatens to strangle many of our native shrubs. In this section of Pennsylvania it is so thoroughly naturalized that one would suppose it was a native. It extends over large areas, and as I write, in August, there are considerable masses of white and cream-colored flowers. In one place it is seen clambering over a lot of old Cedars, and in another it has festooned itself from one Catalpa-tree to another on the summit of a high bank, and as one drives along the highway, about forty feet below, they are very picturesque. I have propagated and collected it very freely and introduced it all along our roadsides. The only attention it gets is a cutting with the scythe or sickle once or twice a year.

Virginia Creeper is making an excellent ground cover, and *Vitis Labrusca* has within three years covered a space of ground fifteen feet square. Of herbaceous plants, *Linaria vulgaris*, *Asclepias quadrifolia*, *Hypericum perforatum*, *Rudbeckia hirta*, *Baptisia tinctoria*, *Eupatoriums*, *Asters*, *Solidagos*, *Strawberries* and *Potentillas*, all of which are most pleasing in their struggling efforts to cover and beautify the ground.

Huntingdon Valley, Pa.

L. F. Horner.

Notes from Botanical Garden at Smith College.

To the Editor of GARDEN AND FOREST:

Sir,—In the collection of tropical plants which are planted out in the large Palm-house here are three species of *Musa*, namely, *M. paradisiaca*, *M. Chinensis* (Cavendishi) and *M. textilis*. All have made phenomenal growth this season. They were planted about the last week in April, when *M. paradisiaca* was about four feet high, a mere sucker in a ten-inch pot. It now measures twenty feet in height, with leaves eight feet long by two and a half wide, while the stem at one foot from the ground is twenty-seven inches in circumference. *M. Chinensis* was also a small plant, about three feet in height; it is now ten feet tall, with leaves five feet long by two and a half wide. This species is naturally dwarf-growing. *M. textilis*, which was in an eight-inch pot and about two feet high when planted out, is now twelve feet in height, with leaves five feet six inches long and eighteen inches across, and has several suckers almost as large as the parent plant. This species is admirably adapted for use with other tropical plants. It does not grow to the proportions of the taller species, but the stems and leaves, which are of a grayish-green color, have a partic-

ularly handsome and graceful appearance. The bed these Musas are growing in is about five feet in depth, composed of good rich soil, and they have had plenty of water.

The hardy *Nymphaeas* in the ponds in this garden, particularly *N. Marliacea chromatilla*, grew so luxuriantly this season that many of the leaves were forced several inches above the water. During the hot weather these became much shriveled and sunburnt, and by the end of July were unsightly. As an experiment, the leaves were all mown off about six inches below the surface of the water. New growth and flowers soon followed, and for the past six weeks the plants have borne more flowers, and with their fresh green leaves have been even more attractive than they were in spring. Whether this will have any ill effect on the vitality of the plants remains to be seen; but it is preferable, in my opinion, to have the two crops of flowers, even at the expense of the plants.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Asparagus Rust.

To the Editor of GARDEN AND FOREST:

Sir,—In the last issue of GARDEN AND FOREST attention is called in the Notes to Professor Halsted's recent article on the Asparagus rust, *Puccinia Asparagi*, from which it is inferred that the malady is probably confined to a few localities. I wish to state in this connection that the Asparagus-plants at the Agricultural College here are completely covered with the same rust this fall, although I cannot say how far it has been disseminated in other parts of the state, neither have I noticed it on the College plants previous to this year.

Massachusetts Agric'l College, Amherst, Mass.

G. E. Stone.

The Forest.

The Burma Teak Forests.—XII.

PORTIONS OF THE FORESTS MAY EVENTUALLY BE GIVEN UP FOR THE EXTENSION OF CULTIVATION.

IT is not unreasonable to suppose that the time will come when the timber requirements of the country, and the demands of the world's markets, can be provided from a much smaller area than that at present reserved. Many of the Karens are taking to a more settled, a more civilized system of cultivation; they make permanent paddy-fields in the place of their shifting *toungyas*, but this must necessarily be a slow process, and meanwhile the increasing yield of the forests will make it possible to find room for them even beyond the areas assigned to them under the present settlement. The real strength of the gigantic British Indian Empire consists in the prosperity and contentment of its inhabitants. The British nation may well be proud of having accomplished this—of having established a strong, just and considerate Government among the numerous nationalities of British India. It may not be generally known that those provinces of India which are under British government have nearly one-third the area of the United States, without Alaska, while the population is much larger—namely, 225,000,000. Including the native states, the British Indian Empire at present has an area of one and a half million square miles, with a population of 300,000,000.

CONCLUDING REMARKS.

It has been stated that strong opposition was raised in the earlier days against the demarcation of reserved forests in Burma. Even some of the principal forest officers, after I had left Burma, supported this opposition, and their strongest argument was that the natural forests should be left to the Karens, and that for the supply of Teak timber in the future we should exclusively rely upon plantations made, if possible, in the open country outside the forests. All mature timber in the forests could then be cut at once, and this would give a powerful stimulus to the trade and prosperity of the country.

Fortunately, these views did not at that time prevail. Slowly, but steadily, the forest revenue had increased. The merchants of Rangoon were as anxious as they had been in 1860 to get the forests into their own hands, or, at least, to girdle as much timber as they wished. But the steadily growing surplus revenue was accepted by the Government as proof that the system initiated in 1856 was a good one and ought to be maintained. And when in 1886 upper Burma was annexed the good financial results of forest management in lower Burma led to the adoption of a similar system for the new territory. The forests of upper Burma are exceedingly rich; large quantities of old timber, girdled by the holders of forest leases under the King, are being brought out, and it has been possible largely to con-

tinue girdling operations. The surplus forest revenue of upper Burma is very large, amounting during the five years ending 1893-4 to 1,436,000 rupees a year.

The far-sighted forest policy laid down by Lord Dalhousie, and carried out by Sir Arthur Phayre, made it possible to initiate a good system; its maintenance, however, is chiefly due to the growing surplus forest revenue. Nay, it is not too much to say that the Burma surplus forest revenue has largely contributed to the establishment and maintenance of a good forest policy in the British Indian Empire. The figures for the five years ending with 1893-4 stand as follows:

Mean annual	British India. Rupees.	Burma. Rupees.
Gross revenue,	15,949,000	4,978,000
Expenditure,	8,603,000	1,672,000
Surplus revenue,	7,346,000	3,306,000

The mean annual surplus forest revenue of Burma amounts to forty-five per cent. of that produced by the forests of the whole British Indian Empire.

The reader may ask whether too much stress has not here been laid upon the production of surplus revenue from the forests. The value to the nation of well-managed public forests consists less in the annual surplus revenue which they give than in the accumulated capital value which they represent, the supply of timber and other produce which they yield and in the protection which they afford to agricultural and other interests. The real advantages of good forest management, however, are not yet recognized everywhere. In England, at least, and probably also in the United States, most people will be disposed to judge the management of forests by the surplus revenue they yield.

Though the present paper has extended to great length, I have no right to expect that the reader has fully understood the leading facts connected with forest management in Burma. A few practical points, however, have, I trust, been prominent. These I should like to recapitulate and particularly to submit them to those who may in the United States have to undertake the management of forests similarly constituted.

First. Collect data as soon as possible regarding the marketable species, growing stock, rate of growth and their requirements.

Second. Cut sparingly, regulating your cuttings, according to circumstances, by area or by volume.

Third. Select the trees to be cut with due regard to the maintenance of the most valuable species.

Fourth. Increase the proportion of the more valuable kinds by planting or by other means.

Fifth. Resist, if possible, the temptation to make a big boom at the outset, and form your plans so as to secure a sustained and, if possible, a steadily increasing yield from the forests.

Sixth. If the question has to be decided which areas should be selected to be demarcated as reserved or state forests it is best at the outset to make these areas as large as possible. Hereafter, when the yield of these areas is known, it will be easy to give up such portions as may be less valuable for the extension of cultivation and in order to provide local labor in the forests.

Bonn, Germany.

Dietrich Brandis.

[This installment concludes the instructive chapter in the history of skilled forest management which Sir Dietrich Brandis has been kind enough to provide for our readers. It is, perhaps, the most important experiment of the kind which has been inaugurated during the century, and, considering the difficulties encountered, the most successful in a large way, so that a sketch of it by the originator of the scheme has a value which every student of forestry will appreciate. In response to requests of correspondents, we shall publish a small edition of these articles in pamphlet form.—Ed.]

Recent Publications.

Camping in the Canadian Rockies. By Walter Dwight Wilcox. With twenty-five full-page photogravures and many text illustrations from photographs by the author. G. P. Putnam's Sons. 1896.

This book is not a record of pioneer life, nor the work of a geological or mining explorer, or of a railway engineer, or of a hunter or naturalist, but simply of a man who enjoys camp life, who climbs mountains because he loves to do it, and who takes photographs with much more skill than the ordinary amateur. Mr. Wilcox, indeed, manifests

some interest in the geography of the region, but this seems quite incidental, and he evidently has no idea that his readers care for information of this character or he certainly would have furnished them with a map of some kind, even if it were nothing more than a rough sketch. His excuse that there are no detailed maps to cover the region is not quite satisfactory, and the lack of such a help must be looked upon as a blemish to the book. Nevertheless, all who have enjoyed the experience of camp-life in the mountains, and the much larger body of persons who have never had that pleasure, but who entertain an inward longing to try it, will be grateful to have their attention directed to this book. In the first place, it is attractive to look at, printed on excellent paper and with large, bold-faced type, and the illustrations have a genuine artistic quality. That is, Mr. Wilcox has the faculty of selecting a point of view from which his camera looks out upon a well-composed picture, with all that is distracting excluded. Many of the photogravures are conspicuously good and reproduce in a striking way the pictorial effects of these great mountain masses, glaciers, lakes and streams.

It is the glaciers which give the crowning interest to these Canadian Rocky Mountains, for they do not reach the height attained by the range within the United States. But these great stretches of ice, with their lofty surroundings, are many of them uniquely beautiful and make a most impressive appeal to the imagination. And then when we consider that 120 of them may be counted from the summit of Mount Abbott, and even more are in view from Eagle Peak, it can readily be seen that a summer can be passed in a comparatively small district with a glacier to be studied every day. Every reader will share Mr. Wilcox's evident enjoyment of this wonderful scenery, and, although he has not the large descriptive and poetic faculty displayed by Mr. Muir, he writes in such a straightforward, manly way that every reader feels that he would enjoy life under the same tent with him. Camp-life, when it has an established base of operations at a first-class hotel, and possesses all the modern equipments for comfort and convenience, has hardly enough of hardship and adventure in it to satisfy those who lie in a hammock and read about mountaineering, and yet there was enough of danger and privation in Mr. Wilcox's experience to demand patience, courage and resolution and to test the nobler qualities of a man. After the quiet descriptions of perilous ascents and of various trials and privations encountered, one feels that the author speaks only words of truth and soberness when he argues that life in the mountains is an education, especially in the way of strengthening character. Before these ranges are thoroughly explored and their highest summits scaled the nerve as well as the muscle of many a camper will be put on trial. Mr. Wilcox presents many facts relating to the geology, the climate and the vegetation of this region, much about the Indians, the game animals and the lower forms of life, but the primary excellence of the book is its buoyancy of tone, which exhilarates like mountain air. This is seen not only in descriptions of scenery, but in the experiences of camp-life, with its adventures and pleasures, its labors and disappointments. The author does not complain because the storms do not abate to suit him or because the mountain paths are hard. He makes the best of every risk and discomfort, although he has the good sense to realize that it is the part of wisdom to fortify himself in every possible way and not to encounter hardships for their own sake. Here is a little advice which every one who meditates enjoying a summer vacation among these glaciers will do well to heed:

Let the camper surround himself with all the luxuries that are possible without trespassing on the bounds of reason; let him have a good cook and a good packer; horses that are used to travel; a fine camp outfit, comfortable blankets and a good tent; a full supply of cooking utensils, knives, forks and spoons; above all, let him take an abundant supply of provisions, comprising a large variety of dried fruits and the various cereals, and let each article be of the best quality.

Exhibitions.

Flowers and Fruits at the American Institute Fair.—II.

AS we go to press a collection of Chrysanthemums is on exhibition at Madison Square Garden, although it is, of course, too early for many of the best kinds. Last week few flowers were seen on the tables, although there was a fine display of Cosmos, which in color, size and graceful poise we have never seen excelled. Mr. Childs, too, had some admirable spikes of Gladiolus of the Lemoine type. A few superb Roses were contributed by E. W. Bliss, gardener to A. J. Wengertner, Bay Ridge, New York, and a good collection of ornamental plants was shown by Mr. Dimmock, the American agent of F. Sander & Co. Very effective, too, was a table of Cacti, including some fifty varieties, among which was an example of *Cereus giganteus*, and exhibited by M. Keppler.

The greater part of the space, however, was given up to apples, and a magnificent show they made. The most complete collection was sent by the New York Experiment Station at Geneva, and it consisted of 225 varieties of apples, besides some of the best American plums, and many of the newer varieties of grapes. These were all carefully named, and formed a valuable object-lesson to those who wish to study and compare varieties. The management has concluded to let them remain to the end of the exhibition on the 29th, and it is hoped that all interested in pomology will appreciate this opportunity. Two other exhibitors, Messrs. White & Rice, and T. F. Pierson, showed as many as 175 varieties each, and there were some admirable entries for a smaller number of varieties, especially that of Mr. Charles C. Kromer, every plate of which was worthy of a first prize.

Vegetables were surprisingly good. The Riverhead Town Agricultural Society showed a collection of fifty-three different sorts, with more than 200 varieties, which, considering the lateness of the season, was remarkable. J. M. Thorburn & Co., Peter Henderson & Co., J. W. Foster, of Yonkers, and J. Van der Wend also made large entries. None of these exhibits, however, had greater attractions for visitors than the vegetables contributed by the vacant-lot farmers in this city. Taken together this display was very comprehensive. One of these farmers, Mrs. Miller, showed thirty-five varieties, every one of which was well grown. A large bunch of peanuts, still attached to the plants, and grown in a vacant lot along Fifth Avenue, created a mild sensation.

Notes.

Staple products affected by short crops include currants, raisins, figs, cloves, Grenoble walnuts, Sicily filberts and Texas Pecan nuts, all of which have recently advanced in price. Hickory nuts are also scarce, and the new crop sells for half as much again as old nuts carried over in cold storage, the latter constituting the main supplies now.

Among fruits still seen in excellent condition, but in light demand because their season is past, are large firm water-melons, offered at forty-five cents each, and choice Maryland peaches, which find few purchasers at fifty cents for a basket holding thirty selected fruits of first size. In one of our markets barberries are offered, the tart red berries being prepared for the table much as cranberries are. Pomegranates, from Spain, cost fifty cents a dozen.

Many of the primary schools in southern Russia have orchards and kitchen gardens attached for the use of the schoolmaster, as well as small model kitchen gardens, tree plantations, or farms, in which gardening and silviculture are taught. Even vineyards are to be found in connection with some of the schools in Caucasia, and the pupils are carefully instructed in silkworm culture and beekeeping. *The Gardeners' Chronicle* well remarks that besides encouraging the pursuit of agriculture as a calling, and in this way diminishing the rush of population to the towns, these school-gardens have another immediate good effect, and that is upon the health of the children by the interchange of outdoor study with sedentary work in the schoolroom.

Courses of informal talks on botanical subjects, with illustrations by charts, blackboard demonstrations and specimens, will be given to private classes, village improvement associations and similar organizations by Miss Dock, who is known to our readers as an occasional writer for GARDEN AND FOREST. One of these is an historical course, giving the development of modern botany; another is descriptive, outlining briefly the history and distribution of a few of the well-known families of

plants, with some practical suggestions as to the preservation of wild roads and wayside shrubs; the third is arranged for students preparing to take a botanical course in our universities. Terms and additional particulars may be had on application to Miss M. L. Dock, at 1427 North Front Street, Harrisburg, Pennsylvania.

Up to the 8th of October 273,287 barrels of American apples had been received at the port of Liverpool alone, while during the same period last year only 19,554 barrels had been received, an increase of over a quarter of a million barrels. In a circular of a leading Liverpool dealer it is stated that if the fruit had all been of the first quality that market could hardly have absorbed this tremendous quantity in so short a time, and especially so early in the season. But since far the greater proportion of the fruit was defective in condition and had to be forced off, as it could not be held, the results have been cruel to shippers. Sound and tight barrels of King apples, from New York and Boston, varied somewhat during the second week in October, but averaged \$2.75, although the Canada apples brought a trifle more. Baldwins, Hubbards-tones, Greenings and Northern Spies sold for lower prices, some of the best stock bringing only \$1.25 a barrel. These were the top prices for the week, but defective and "slack" barrels often brought seventy-five cents less.

Professor Lamson-Scribner writes to *The American Agriculturist* that the United States furnishes thirty per cent. of all the Grass species of the world, besides a greater number of valuable native forage plants than any other continent. One of the best lines of work looking toward the development of improved varieties is that of bringing our native plants into cultivation. These home species are best adapted to the conditions here, and it is folly to think that better forms can be introduced from Europe or Australia, where climate and soil and the amount of rainfall are different. The meadow Grasses of our parks, woodlands and mountain slopes, the Grama and Buffalo Grasses of the southwest, the blue stems of the eastern prairie belt, ought to be studied and tested. What we need to do is to go out into the fields and meadows and select and propagate the thrifty grasses and native clovers, persistently working as the horticulturist has done to produce the best varieties of fruit, and the florist to secure the most highly developed flowers. Every cultivated grass, grain and fruit has been developed from exactly such small beginnings, and when we take into account the magnitude of our grazing industry it is evident that the line of work indicated is exceedingly important.

The monks of the Middle Ages were usually sagacious enough to select fertile and sheltered locations for establishing their cloisters, and they surrounded them with rich fields and gardens. At Interlaken, Switzerland, on the deep alluvial soil deposited by the rivers which came down from the great Bernese Oberland, a monastery and nunnery were founded in 1130. The monks planted a grove of Walnuts, *Juglans regia*, about their buildings and a long avenue connecting the cloisters with the neighboring village of Aarmühle. They had learned from the east and south, no doubt, the value of the rich, fruity oil yielded by the walnuts, and to this day it is pressed in quantities here and used as a substitute for olive-oil. The Walnut-trees still survive, hoary with age, picturesque and venerable. They now line the fashionable promenade, Hoheweg, where the whole world throngs to pay homage to the Jungfrau, crowned with her eternal snows. Throughout the country round about here Walnut-trees are very common, and they are probably seedlings from nuts which have been carried away by squirrels from the parent trees. To-day, within the walls of the old cloister, the present Kreis Forester of Interlaken has established a little "plant school," where all sorts of seedlings are grown, to be used in the work of protecting the flanks of the mountains against torrents from melted snow. Thus the monks built better than they knew, and, in a certain sense, the modern forester here is their lineal successor.

The windows of an underground railway carriage in London would hardly seem to afford any remarkable facilities for botanizing, and yet, according to *The Globe*, a Londoner would have to walk many miles before he encountered such an assortment of wild plants as that which he can inspect along the railway banks, for example, between Gloucester Road and Earl's Court stations. The flowers are not all wild, for self-sown Marigolds and Sunflowers give a horticultural aspect to some of the slopes; but besides these a wealth of plants which are associated with hedgerows along country roads is

to be found, which somehow or other have fought their way into the midst of this wilderness of bricks and mortar. The Bladder Campion, for instance, is flowering here profusely, with Mallows, Bindweed, Toad Flax, Coltfoot and Centaury in large clumps and patches, and, doubtless, they are haunted by the same species of insects which make them their home in the country. As entomologists multiply and moths grow scarce it is by no means impossible that these little railway preserves may come to be the last localities where some insects will exist. Perhaps the district railway may in future make a little addition to its revenue by selling tickets for admission for botanists or entomologists to collect rare weeds or pursue evasive Lepidoptera along the railway embankments. These little centres of wild life in London, more thoroughly protected between diverging railway tracks than by lines of fences or cohorts of gamekeepers, are fruitful of scientific possibilities.

Excepting asparagus, all the vegetables of the year may now be readily procured. The last eggplants, from near-by farms, sell for ten cents each, the first from Florida realizing fifteen to twenty cents apiece. The season for field cucumbers in the north is about ended, seven cents apiece being charged for the few in stock, and hot-house cucumbers, from Boston, command eighteen to twenty cents. Lima beans still come from New Jersey, and cabbage is plentiful and cheap. The shipments of tomatoes from New Jersey and Long Island are nearly ended, fifteen cents a quart being the price now asked. Radishes, peppers and squashes come from this and neighboring states, as well as string-beans, though this vegetable is also received from Norfolk and Charleston. Virginia is sending green peas. The cauliflower now offered is notably well grown and showy and sells for fifteen to twenty-five cents a head. The first southern okra of the season, of regular size and even color, brings fifty cents a hundred. Native Brussels sprouts cost fifteen to twenty cents a quart, and the more solid sprouts, imported from France, twenty-five cents a pound. Sweet corn, tender and of good quality, may be had for thirty cents a dozen. Pumpkins cost fifteen to twenty-five cents, according to size. Long stalks of beautifully blanched celery come from Kalamazoo, and shorter stalks of equally good quality from Rochester, in this state, and from New Jersey. Salsify costs ten cents a bunch. Other root vegetables in season are carrots, beets, parsnips, celeriac, radishes, turnips and onions. Sweet potatoes from Virginia and New Jersey cost twenty-five cents a half-peck. Field mushrooms this week bring sixty cents a pound, the cultivated costing one dollar. Mint, chervil, chives and tarragon are among the greens in season, and for salads there are Romaine, and lettuce from Boston, blanched endive and escarole, and corn salad.

The New York Flower and Fruit Mission, founded twenty-seven years ago, ended its work for this season last Thursday. Since May, members of the society have, on Monday and Thursday of each week, personally distributed the flowers to patients in the public hospitals, and many sick persons in tenements have been reached through missionaries and Bible readers. On the closing day contributions came from points in Connecticut, northern New Jersey, Long Island and other sections in this state. These flowers have a special charm in their suggestion of country gardens, meadows and woodlands. The choicest are always sent to patients most seriously ill, while the little bunches which go to the sick blind are made up of the most fragrant blossoms and leaves, lemon verbena being a special favorite. Among the brightest flowers on Thursday were marigolds, dahlias, scarlet sage, geranium, nasturtiums, cockscomb, zinnias, bachelors' buttons, scabiosa, cannas, phlox and late single sunflowers. Cosmos, ageratum, heliotrope, mignonette, sweet alyssum and balm were other garden flowers, with a few roses, sweet peas and early chrysanthemums. Flaming autumn leaves, purple asters, golden-rod, daisies and pink clover had been gathered in wider fields. Slips of plants and vines came in small boxes, with directions for planting in earth or rooting in water, and there were some potted plants, vegetables and fruits. During the season new-laid eggs, jelly and other delicacies suitable for the sick are occasionally received, and these are especially useful. Probably none of our charities are conducted with so little expenditure of money. The flowers and other material are free gifts, and these in packages not exceeding twenty pounds are carried without charge by the express companies. The arranging and distributing is done by some of the members, at no little personal sacrifice during the summer months, when as many as five thousand bouquets have been made in a day; the use of the room is also free.

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Horticulture and Health.

AT the Buffalo meeting of the American Association for the Advancement of Science, Professor W. R. Lazenby, of the Ohio State University and Vice-President of the section devoted to social and economic science, read an essay on the subject which we have taken as the title to this article. Using the word horticulture to include fruit-growing and vegetable-gardening in the realm of domestic art, with floriculture, which is partly industrial and partly a fine art, and landscape-gardening, which lies wholly within the province of fine art, Professor Lazenby discussed the relation of all these divisions to physical, intellectual and spiritual health. Of this broad subject we have only space to examine briefly a few phases. It will be admitted that no calling is superior to horticulture in furnishing pure air, good food, an adequate amount of muscular exercise and restful sleep, all of which are essentials to physical health. The man employed in a greenhouse or garden or an orchard spends most of his working hours in the fresh air and sunshine; his task ends with the twilight, and an unbroken rest enables him to start in the morning with his physical energies renewed. He is not shut up in a crowded workshop, but is brought into close contact with nature, and this is universally recognized as a genuine recuperative force in human life.

But what are the chances of making a livelihood in this country in branches of horticulture which offer such healthful conditions for working? Professor Lazenby asserts that few industries show fairer returns for capital and labor than the cultivation of small fruits or flowers, and there are few that can be started with such small means and have the same capacity of extension into large enterprises. Fruits and flowers are products which are in universal demand—necessities of the rich and appreciated luxuries of those in moderate circumstances. Not only in densely populated cities, but in our fashionable summer resorts, it is rare that the supply of these products exceeds the demand. Good berries and fine roses rarely lack purchasers, and the same is true of vegetables forced in winter, which, after an experience of twenty years, Professor Lazenby affirms, is a profitable industry if it is intelligently and energetically pursued. To substantiate this thesis he states that the vegetable-forcing house belonging to the horticultural department of the

Ohio State University has an area of about 4,000 square feet of glass, comprising two plain structures which can be built for about \$900 each; the total bench space in these two houses is a trifle over one-twentieth of an acre, and the annual sales from them during five years past have averaged about \$600. The products include lettuce, radishes, beets, cucumbers and hyacinths. Besides this, there were grown in smaller quantities, for experimental purposes, parsley, peppers, eggplant, cauliflower, string-beans, onions, mushrooms and a few flowering plants. When it is considered that these houses are in use but little more than half the year the result is certainly encouraging. If small-fruit culture, floriculture and vegetable culture in summer are connected with this winter-forcing of vegetables there are few places where a small capital can be invested with greater certainty of success by an intelligent and thrifty person. The large proportion of failures in business life is due to sharp competition and the great number of persons who are crowding into every opening. There is no such rush toward horticulture by persons of limited means, and the number of those in almost any community who are raising winter vegetables or small fruits might, perhaps, be doubled without lessening the income of any one.

Both floriculture and small-fruit culture especially commend themselves to women who are struggling to support their children in frugal independence. Wherever a small cottage can be obtained with half an acre of land with a warm southward exposure, suitable for early vegetables, the addition of a few cold frames will furnish something to sell all summer long. If a small forcing-house can be added it will give occupation during the winter months, and probably this part of the establishment can be made to bring more profit than the land. In this way Professor Lazenby urges that many a widow could find profitable and congenial employment for herself, and, perhaps, for her children at home, where she could be her own mistress, and not subject to the caprices, or possibly the injustice, of an employer. For such persons few pursuits offer greater inducements for securing a livelihood under conditions which are physically healthful and which stimulate the intellect to wholesome exercise. The experience on the vacant-lot farms in this and other cities has shown that the light work of gardening is well adapted to women, and they soon acquire a deftness and skill which seem to be essentially their own. When such a conservative institution as the Royal Gardens at Kew admits young women as students, it must be allowed that horticulture in some of its branches is one of the occupations which may be considered open to women of intelligence and industry.

Professor Lazenby claims that the practice of horticulture inculcates a reverence for honesty and truth, but we apprehend that it would be difficult to prove that horticulture as a vocation has any stronger tendency to regenerate the morals of a community than any other reputable calling honestly pursued. But there is no doubt that the atmosphere of horticulture is favorable to intellectual health and progress. It is very plain that the ampler knowledge we have of Nature's laws, and the fuller command we have of scientific truth, the better we are able to cope with the problems of practical horticulture, which means the transforming of crude and comparatively worthless material into substitutes of value for food or for administering to our love of the beautiful. A knowledge of botany, chemistry, entomology and geology can all be utilized in floriculture, in vegetable-gardening and in fruit-growing, and any one of these occupations will stimulate the ambitious practitioner to study and cultivate his habits of observation. It is not unfair, therefore, to call horticulture an intellectual pursuit, and the highest success will come to those who keep their minds open and their mental faculties constantly alert. Finally, for those who are not in direct need of the rewards of manual labor, there is no more healthful recreation for mind or body than gardening in all its branches, and it may be added that there is no recreation which will more thoroughly satisfy the inborn longing for the beauti-

ful and the love of natural things. All who believe that there is a higher part of our nature which is worth cultivating, will recognize the æsthetic side of gardening as one of its most healthful influences.

Since horticulture offers so many advantages for healthful relaxation and profitable employment, it is logical to argue, as Professor Lazenby does, that the elements of the art ought to be taught in our common schools, especially since the world is full of men and women who are idle, and therefore both useless and unhappy, because they have never been taught to do anything. Many of the essential facts in regard to the constitution of the soil and the growth of plants can certainly be taught to children, and in a practical way girls and boys can be instructed in the methods of propagating plants from seeds and cuttings and graftings. They can learn something of the common injurious weeds and insects of the region in which they live; they can gain a familiar acquaintance with our native trees and shrubs, and learn something about our useful birds. Such instruction would not require any abridgment of the present curriculum; indeed, one practical result of the healthful variation from constant devotion to books would be greater mental alertness and aptitude for all kinds of study. Especially would this prove helpful in establishing the habit of investigating things rather than memorizing words. It would mean, too, the improvement and adornment of school-grounds, and this would have a refining influence on both teachers and pupils. It must be remembered that horticulture is something more than a mere manual calling. It is a science as well as an art; it develops the faculties of the mind just as any other branch of education does, while the practice of it would improve the bodily vigor of pupils. An elementary knowledge of gardening is the foundation of a trade or calling to every boy and girl, and, even if it was never pursued for a livelihood, there are few persons to whom such knowledge would not prove a comfort and delight. Every one who has a house with a few rods of land attached would find in it at some time of life a solace and refreshment, if not a pecuniary profit; and if modern education aims to make well-rounded men and women, it can be said for this primary instruction in gardening that it will help certainly to develop faculties which would otherwise be dormant, to furnish unfailing recreation for mind and body, and to make life fuller and richer, more natural and wholesome.

An Arizona Cactus Garden.

AN effort has been made during the past three years to bring together on the grounds of the University of Arizona all species of Cacti indigenous to the United States. This garden is, as yet, far from complete; nevertheless we now have some three hundred and fifty specimens representing more than a hundred species. The greater number of these plants have bloomed and produced fruit during the past year. Recently, quite a number of Mexican species have been added to this garden, but under our present circumstances it is not possible to grow plants which will not withstand our winter climate. In this connection I might state that we find such Mexican species as *Anhalonium prismaticum*, Lem., *Echinocactus myriostigma*, Salm., and *E. ingens*, Zucc., perfectly hardy at Tucson. Out of twenty-three Mexican plants of the genera *Cereus* and *Mamillaria* only half a dozen survived the frosts of last winter, while of fourteen species of *Echinocactus* not a single specimen was badly injured, although some of the latter have a much more southern range than the former.

The garden occupies a large triangular plat directly in front of the main University building. When plants are received they are set out in this garden, where they require little attention other than that which nature gives them. So far as possible, specimens are obtained directly from the localities in which they grow; usually a half dozen or more plants of the same species, showing as great variation

as may be found. Plants obtained from dealers have, as a rule, been small and otherwise unsatisfactory when compared with those collected in the field.

The difficulties encountered in studying these plants from skeletons and dried flowers and fruits are very great, as may be noted from the unsatisfactory work that most of our recent authors on this group have given us as a result of their labor. The growing in greenhouses under an environment so entirely different from that which surrounds them in their general habitat and the publication of the results of their study is even more unsatisfactory. The founding of species on such plants, showing all the striking variations which they take on when grown in moist places, under unnatural conditions, has left us as a heritage a synonymy which it is absolutely hopeless to attempt to untangle. Our only hope of getting a correct understanding of these plants is by studying them in the field and bringing them together and growing them under conditions conforming as nearly as may be to their natural environment. The variations encountered even under normal conditions are such that one is bewildered by the multiplicity of forms representative of a single species. Not only are specific characters poorly defined, but generic ones, as yet, have not been drawn with any degree of satisfaction. Although the spine characters are fairly constant in many species, in others no dependence whatever can be placed upon them.

In this garden not only are records kept of the flowers and fruit characters of each species, but herbarium specimens are made, and photographs, from one-half to two-thirds natural size, are taken of flowering and fruiting branches, or of the entire plant if not too large.

An interesting species of *Cylindropuntia* grows in considerable abundance about five miles east of Tucson, but, so far as known, only in this one locality.* It seems to be nearest related to *Opuntia Thurberi*, Engelm., but differs from that plant, so far as one can judge from the incomplete description and examination of type material in the Engelmann herbarium, in its longer, more strongly deflexed spines, smaller and different-colored flowers, etc. It may be known from all related species by its bright scarlet fruit, four strongly deflexed spines and peculiar cork-like margin to the seeds. This plant and *O. leptocaulis* are the only *Opuntias* with which I am familiar that produce small lateral branches no larger than fully developed fruits, the function of which seems to be to drop to the ground and develop into new plants. The fruit matures in December, but remains attached to the plant until the following May. It has an agreeable acid flavor and its bright color makes it very conspicuous against the green stems.

University of Arizona.

J. W. Toumey.

Five Ornamental Oaks.

PROFESSOR S. C. MASON, who has charge of the Horticultural Department of the State Agricultural College of Kansas, writes some interesting notes under the above title to *The Industrialist*, a bright little paper edited and published by the faculty and students of that college. While the trees are specially recommended for Kansas planting they are all good over a very wide range of territory, and they all belong to the biennial fruited section which are much more easily transplanted than the White Oaks. Indeed, Black Oaks a dozen feet high are often taken from the woods and planted in the streets of towns

* *Opuntia tetracantha*, n. sp. An irregular branching shrub 6 to 15 d. m. high; primary branches erect or ascending from a stout woody trunk 5 to 8 c. m. in diameter, and bearing numerous short, lateral branches at irregular intervals; ultimate branches 12 to 15 m. m. in diameter; joints cylindrical, 25 to 30 c. m. long, with a reticulated woody skeleton; tubercles at first prominent, 16 to 22 m. m. long, but on old stems more or less inconspicuous; pulvini sparingly covered with wool and bearing a small crescent-shaped tuft of light brown bristles at the upper margin; spines usually four, stout, loosely sheathed, straw-colored, strongly deflexed, flattened, 2 to 3.5 c. m. long, occasionally one or two smaller ones, not increasing in size and number after first season's growth; glands conspicuous, a half dozen or more between the spines and bristles; flowers greenish purple, 1.5 to 2 c. m. broad; fruit ovate to subglobose, narrowly but deeply umbilicate, 2 to 2.5 c. m. long, juicy, scarlet, usually nearly smooth, but sometimes some of the pulvini bearing 1 to 3 strong deflexed spines; seeds irregular, 3 to 5 m. m. in diameter, commissure broad, with conspicuous spongy appearance.

and cities in our southern states and prove among the very best of street trees. Of course, nursery-grown trees which have been transplanted once or twice are better. Some of these Oaks grow rapidly while young, and they have no superiors for ornamenting parks and roadsides. We give below the greater portion of Professor Mason's article:

Quercus rubra, the Red Oak, becomes a majestic tree of more than a hundred feet in height and six feet in diameter. It has fewer small branches than other species of the Black Oak, and the smooth, iron-gray bark of the young trees is retained to a much greater age than in others. Its range in North America, according to Professor Sargent, is from New Brunswick and Nova Scotia to Florida, and westward to Minnesota, Kansas and eastern Texas. In Kansas, it is found as far west as the valley of the Blue River; scattered along creek valleys in Wabaunsee and Geary counties, but reaching its greatest development in the Neosho and Verdigris valleys of southern Kansas, seeming to prefer rich but well-drained valley soils and lower uplands, but occasionally found in groups along the cool northern slope of some bluff fronting a small stream. It makes a very fine upward growth as a young tree, forming a smooth, clean trunk, with long, upright branches. The leaves are only slightly lobed and of a bright, rich green color. The acorn is large and long, set in a broad but very shallow cup. Altogether, this is one of the most striking of our native trees.

Quercus velutina, while a much less imposing tree, attains a good size on the clay uplands of Kansas as far west as the Blue River, and makes a very handsome tree while young. As it grows older, the dying out of the thick lateral branches disfigures it somewhat in a wild state, but this can be corrected in specimen trees by pruning as they begin to fail.

Quercus palustris, the Pin Oak, is found in large tracts along the Marias des Cygnes, Neosho and in other portions of south-eastern Kansas, its range being from Massachusetts to Maryland and westward. It is found in heavy "gumbo" soil, and often where water stands for a portion of the year. The young trees grow erect in a single straight trunk, with numerous horizontal branches, the lower ones of which soon droop, often sweeping the ground. The effect on the landscape of a river-bottom filled with a broken, park-like growth of these trees is very peculiar and striking. Young specimen trees in the College grounds are among the most beautiful in our collection. They will be found well adapted to planting in the north-western portion of our city.

Quercus imbricaria, the Shingle Oak, extends from Pennsylvania westward through the central states to eastern Kansas, being found in Wyandotte, Leavenworth and Johnson counties. It differs from all other Kansas Oaks in the entire lanceolate, oblong leaf. The trees tend, like the Pin Oak, to the growth of a straight central axis, thickly set with small radiating, horizontal or drooping branches. With the abundance of shining rich green leaves, often overlapping, the trees of this species are very handsome on the lawn or in the borders of a group. They prefer rich upland soil to the bottoms, and are well adapted to general ornamental planting. Among mature trees occasional specimens may be found three feet in diameter and fifty or sixty feet high, when the bark of the trunk becomes black and deeply furrowed.

Quercus phellos, the Willow Oak, has much the same habit of growth as the preceding, but the leaves are narrowly linear-lanceolate, and the whole aspect as little like the general conception of an Oak-tree as can be imagined. Grace and beauty are not usually regarded as characteristics of the Oak, but rather sturdiness and ruggedness. Yet the Willow Oak may well be called graceful as a young tree, and for lawn specimens and borders of groups is well worth attention. This interesting Oak is not found within our borders, but has a more southern range, south-eastern Missouri being the nearest to us.

In the sandstones of the cretaceous formation of central Kansas are found the earliest imprints of leaves and fruits of such families of trees as comprise our present forests. Among these are a few Oaks, and it is of interest to note that the leaves are of the same type as the last two species mentioned, having entire margins and linear-lanceolate or oblong leaves.

[To this list might have been added *Quercus Texana*, the Texas Oak, the tallest of American Oaks, and one of the most beautiful of them all. This noble tree, which probably extends to the eastern borders of Kansas, has usually been confounded with the Red Oak. *Quercus coccinea*, too, the Scarlet Oak, which surpasses all other Oaks in the beauty of its autumnal foliage, should not be omitted from any list of Oaks for Kansas plantations.—ED.]

Foreign Correspondence.

London Letter.

NEW PLANTS.—A descriptive list of new garden plants of the year 1895 has just been issued from Kew, forming Appendix II. of the *Bulletin* for 1896. A similar list has been published each year since 1887, and as each list contains on an average about four hundred and fifty plants, the total number comprised in the nine lists issued will be something like four thousand. These are all either new introductions or garden hybrids of botanical as well as horticultural interest. In every case the plant is cited under its published name, followed by a reference to the publication in which it was first described, and also to a figure if one has been published. A brief description of the plant is then given, its habitat, and the name of the person in whose collection the plant was first noted or described. The following example will show how each plant is treated: "*Anectochilus Sanderianus*, Kranzl. (Gards. Chron., 1895, xviii., 484), Orchideæ. Stove. Described as a probable new species. Leaves ovate, four inches long, dark olive-green with yellowish reticulations; scape one foot high, flowers pale green. Sunda Islands (F. Sander & Co.) [Since described as *Macodes Sanderiana*, Rolfe]." These lists are most useful to those who are interested in new plants for the garden, and they are of special value in maintaining correctness of nomenclature. I find them most helpful in various ways. It is intended to rearrange the lists in the form of one for every ten years. Compared with previous years the list for 1895 is short, the total number of new plants amounting to 363, that for the year previous being 461. The number of Orchids included in the list for 1895 is 206, the number in the year previous being 212. These figures show how preponderating a position Orchids continue to hold among garden plants. The price of the list is five pence, post free.

HAND-LIST OF TREES AND SHRUBS AT KEW.—The second part of this list has now been issued. The first part was noticed at some length in *GARDEN AND FOREST* in January last year. The list of Coniferæ, issued early this year, has also been noticed. We have now in these three lists a complete catalogue of the hardy ligneous plants cultivated in the Royal Gardens. Roughly, this comprises some three thousand species and botanical varieties, some five hundred of this number belonging to Coniferæ and eighty to Monocots. The nomenclature is practically that of the *Index Kewensis*. An enormous number of garden synonyms are quoted and placed in their proper places. This is, perhaps, the most useful feature of these lists, the aliases of many species being numerous and confusing. The accepted name of each species is printed in large type, with the author's name, a reference to a figure, and the habitat. The price of part II., which includes the genera from Gamopetalæ to Monocotyledons, is one shilling and three pence, post free, or the three lists may be had in one volume, price two shillings and four pence.

FAVOURITE FLOWERS OF GARDEN AND GREENHOUSE.—This new serial work on cultivated plants is now being issued by Messrs. F. Warne & Co., London, who have had the work in preparation for some years and claim for it an equal share of public favor with their now well-known *Royal Natural History*. *Favourite Flowers* will contain 316 full-page octavo plates, printed in natural colors and generally life-size, with about 700 pages of descriptive letterpress. It is being issued in fifty-two weekly numbers, each one shilling, or in four quarterly bound volumes, each fifteen shillings. The plan of the work is novel. The genera are arranged and described in botanical order, beginning with Ranunculaceæ and ending with Ferns. Select species and varieties in each genus are described, and directions for their culture given. The colored plates represent one or more typical species in each genus.

THE BEST ROSES.—A carefully prepared analysis of garden Roses is printed this week in the *Journal of Horticulture*,

from which the following may be interesting to your readers. The best of all Roses as an exhibition flower is Mrs. John Laing, Hybrid Perpetual, which since its introduction has held a first place among show Roses. Next to this are placed Ulrich Brunner and Madame Gabriel Luizet, the former standing first among crimson sorts. It is, I am told, identical with your American Beauty.* La France is given first place among Hybrid Teas, and this is, I observe in Mr. E. J. Hill's interesting note, also a favorite with you. The Teas and Noisettes are to me of more interest than any others, and the following are the best dozen sorts according to the analysis: Catherine Mermet, The Bride, Comtesse de Nadaillac, Innocente Pirola, Maman Cochet, Marie Van Houtte, Souvenir d'E. Vardon, Souvenir d'un Ami, Ernest Metz, Souvenir de S. A. Prince, Niphetos and Madame Hoste. The American variety, Bridesmaid, raised by May and sent out in 1893, stands twenty-eighth on the list of favorites. The two best Teas introduced since 1890 are, in the opinion of the leading rosarians, among nurserymen and amateurs, Maman Cochet and Bridesmaid. I feel certain that Tea and Noisette Roses are destined to take a much more prominent place in gardens even than they occupy now. Ever since the beginning of June our beds of these Roses have been gay with flowers, and now, in October, long after the Hybrid Perpetuals have ceased to do more than develop an odd flower here and there, our plants of Marie Van Houtte, Laurette Messimy, Souvenir d'un Ami, Caroline Kuster and Comtesse Riza du Parc are heavily laden with beautiful flowers and buds in all stages of development, so that, unless severe frost comes, we shall have a fine display of these Roses till well into November. Many cultivators declare that Tea Roses are too tender to be grown successfully out-of-doors, but, I say, do not believe it till you have tried them well. They were once considered hopeless at Kew.

EXHIBITION OF FRUIT.—The Royal Horticultural Society's great exhibition of fruit grown in Great Britain has been held again this year at the Crystal Palace, and, although the number of dishes staged fell short by some hundreds of those staged last year, the displayed lacked nothing in variety and quality. It is surprising how the standard varieties continue to occupy first place among the favorites; thus, in apples, the four that ranked first in popularity with exhibitors are among the best six apples grown—that is, Cox's Orange Pippin, Rebston Pippin, King of the Pippins and Warner's King. No less than one hundred and seventy-two varieties of pears were represented. There was some wisdom in the observation made at the conference that of this number one hundred and fifty could well be dispensed with. The first quartet among the one hundred and sixteen varieties shown was Pitmaston Duchess, Marie Louise, Doyenne du Comice and Beurre Diel. Coe's Golden Drop was the best plum. At the conference papers were read on Fruit as Food, The Cider and Perry Industry and Gathering and Storing Apples and Pears.

London.

W. Watson.

New or Little-known Plants.

Restio subverticillatus.

THE illustration on p. 435 is from a photograph of a specimen of *Restio subverticillatus*, which has been an object of interest in one of the greenhouses at Kew for the last fifteen years. There is also a fine specimen of it in the Edinburgh Botanic Gardens. It forms an elegant mass of arching Bamboo-like culms from three to six feet long and clothed with long filamentose branchlets, a well-furnished culm suggesting a horse's tail. The plant is perennial, and it produces its culms freely, the branchlets remaining green upon them for several years. I know no plant, either indoors or out, that presents anything like the appearance of this. It might be described as a singular

combination of the characters of a Rush and a Casuarina. Being a female plant, and the only one, it does not mature seeds at Kew, although it produces the small Triticum-like red spikelets on the apices of the branchlets in great abundance. It may be propagated by means of division of the root-stock or from cuttings formed of the branchlets which are borne in whorls on the culms similarly to the branchlets on Bamboos. The Kew specimen is planted in a bed of gravelly soil in a sunny position in an intermediate house; the Edinburgh plant is grown in a large pot along with Cape Heaths, etc. We find that it enjoys plenty of water always.

We are unable to find any record of the introduction of this species. Thirty years ago Dr. Masters described it under its present name in a monograph of the genus *Restio*, published in the *Journal of the Linnæan Society*, vol. viii., where he says that at that time it was grown in English gardens under the name of *Willdenovia teres*. It is a native of south Africa. The order Restiaceæ is related to the Sedges (Cyperaceæ) and comprises about twenty genera and 250 species, all natives of either south Africa or Australia. There are about a hundred species of *Restio*, but so far as is known only that under notice has any place in horticulture. In *The Treasury of Botany* it is stated that none of the species of *Restio* are "of any special interest or deserving of cultivation." We should say that in gardens where *R. subverticillatus* can be grown out-of-doors it would prove a highly ornamental plant for the water-side, and that it is likely to find favor as a pot-plant is seen in the fact that one of our leading nurserymen has acquired a stock of it to work it up for the market.

London.

W. Watson.

Plant Notes.

CALYCANTHUS LAVÆGATUS.—The Sweet-scented Shrub, or Carolina Allspice, *Calycanthus floridus*, grows wild in the rich woods south of Virginia, and none of our native shrubs is more frequently seen in gardens new or old. Its deep wine-colored or lurid purple flowers are well known for the exquisite strawberry fragrance which they exhale when crushed. Occasionally it is killed in cold winter, but *C. lavægatus*, another native species, has a rather more northern range, extending along the Allegheny region well up into Pennsylvania, and it is altogether an admirable shrub. Its large oval leaves, with a rather sharp apex, are green on both sides, slightly roughened above, and its flowers are rather smaller than those of *C. floridus*. The leaves rarely show much autumn color, although just now some of them about this city have turned to a clear yellow, and so, by the way, have the leaves of *C. floridus* in Central Park. *C. lavægatus* is a shrub of excellent habit, its outer branches arching to the ground in a circle five or six feet across. For lawn or park planting its abundant rich-colored, healthy foliage makes it most desirable.

Cultural Department.

Utilizing Coal Ashes.

COAL ashes are gradually gaining for themselves a distinct place in horticulture. It is usually removed to the dump-heap, thrown upon the walks and drives, or used for filling where it can be well covered with the surface soil, and yet it is doubtful if a better material than coal ashes can be found for certain purposes about the greenhouse. The method of potting bulbs and burying them deeply to exclude the light, so that roots may be formed before the tops start into growth, has much to commend it, and coal ashes is one of the best materials for covering them. Their texture is such that good drainage is obtained and more air admitted than would probably enter most soils. Moreover, the ashes, being direct from the furnace, contain no form of life, either animal or vegetable, and insects do not thrive in it; hence a comparative freedom from subterranean parasites is insured, and bulbs are less liable to decay than when ordinary soil is used. A table or

* Rosarians in this country consider American Beauty identical with the Madame Ferdinand Janin.



Fig. 57.—*Restio subverticillatus*.—See page 434.

bench covered with about two inches of coal ashes, firmly compacted, makes a good place for potted plants, and for a time snails will not be troublesome; after a few months, however, the ashes become covered with dirt that has washed from the pots, and snails will venture into it. It is then time

to clean the bench and add fresh ashes. Potted plants may be plunged in a bench of coal ashes with excellent results.

Cuttings from plants easy of propagation may be rooted in coal ashes, though not as readily as in the best cutting-bench sand. On the 28th of February last some Tomato cuttings

were put in the cutting bench, and at the same time an equal number of cuttings set in an adjacent bench filled with fresh coal ashes. All struck root, and on March 18th, when they were removed for potting, plants from the cutting bench had roots averaging one and a half inches in length, while those from the coal ashes had roots an inch long. The ashes did not hold moisture as long as the sand, which, perhaps, may account for the difference in length of the roots.

It is only recently that coal ashes have been used as a medium or soil in which to grow plants. Sifted to pass a screen with four meshes to the inch, and mixed with three or five per cent. of peat-moss, ashes form a soil which is at once light and friable, does not bake or puddle, and in which roots develop nicely, and the plant makes a satisfactory growth, provided there is plenty of plant-food present in a form to be taken up and assimilated. The peat-moss which has been mentioned is baled and sold for use in stables. This must also be sifted when used in making an artificial soil, and is added to the ashes to render the mixture more friable and more retentive of moisture. Plants stand more firmly in it, too, if peat-moss has been added, though some plants are known to grow well in the soil when the peat-moss has been left out entirely. A soil so constructed is practically sterile as far as plant-food is concerned. The ashes contain a little potash and phosphoric acid, but no nitrogen. The peat-moss has about one-half of one per cent. of nitrogen, but this is in a form not to be received readily by the plant. Hence it is necessary to add plant-food in order to produce a crop, but the exact amount of each chemical element necessary for the best growth and development of the plant can be determined, of course, only by experiment. Such a soil is especially valuable for use in experimental work with nitrogenous fertilizers, and has been employed for four successive seasons at the Connecticut Agricultural Experiment Station in a series of vegetation experiments to determine the relative availability of organic nitrogen, and for two seasons the same mixture has been used in greenhouse benches in studying the fertilizer requirements of forcing-house crops. Not only has this soil produced good crops with the proper application of fertilizer chemicals, but in some cases a larger yield resulted than could be obtained from a good natural soil with a liberal quantity of stable-manure added. Tomatoes, Lettuce, Radishes, Cucumbers, Melons, Cress and Carnations have been grown in it with more or less satisfactory results, while in the first series of experiments Corn, Oats and Rye were grown. Both bituminous and anthracite ashes have been used; the results have been about the same, and ashes from the two kinds of coal seem to differ very little either in physical character or chemical composition.

It is not improbable that an artificial soil consisting largely of coal ashes may soon come into commercial use for greenhouse work. The freedom from all living organisms is a strong point in favor of such a soil. Nematode-galls will not be formed upon the roots of plants growing in it. The grower must, however, be well versed in the chemistry of fertilizers in order to understand the effect of each ingredient, and know how much of each element of plant-food to apply. It is doubtful if the cost of preparation exceeds or equals that of the compost ordinarily used by gardeners, and it is probable that any crop which responds to the fertilizing influence of chemical manures in readily available form, may be produced from a soil of coal ashes and peat-moss, especially under glass, where all atmospheric conditions may be controlled.

Agric'l Experiment Station, New Haven, Conn.

W. E. Britton.

The Vegetable Garden.

AT this season, when frosts have destroyed all tender crops, the vegetable garden makes an untidy appearance unless the plants are promptly cleared away. Too often they are left on the ground and are an eyesore until spring. Of course, such habits are unknown on well-regulated places, but many gardens only look tidy when the ground has been dug and cropped in April or May, and thus weeds are allowed to exhaust half the nourishment from the soil. Wet, sunless weather has recently interfered with outdoor work, but as soon as the ground has dried off we shall clear away any remaining useless crops and hoe the weeds clean from all fallow ground.

With the coming of colder weather Celery must be well earthed up on a dry, sunny day, when the soil is not wet or pasty. The early varieties, such as Paris Golden and White Plume, which have been blanched by boards, should be banked with soil or have hay or leaves scattered over them. As a rule, we do not have severe frost until December, and the two varieties named give us a supply until Christmas, and

Giant Paschal, Kalamazoo and Boston Market are depended upon until about the end of March. Much has been written about methods of storing and preserving Celery for winter use, but there can be no question that if a sweet, nutty flavor is desired the plants must not be disturbed at the roots and stored in a dry cellar. The most satisfactory way to have clean, crisp stalks is to protect the ridges with a thick coating of leaves or seaweed. It is easy to dig into the trenches, even in the most severe weather, and decayed, useless heads are rare if banking and protecting have been carefully adhered to. We work some slaked lime among the soil when we bank up our plants; this serves to keep worms away.

This is a good time to manure and dig over any vacant squares of ground, thus lessening the strain of spring work. For root crops, such as Carrots and Parsnips, which do not grow straight and clean in heavy land, we deeply trench the ground and work in a liberal quantity of sand, road-scrappings and fine coal ashes, in addition to manure. For places where crops have been grown for many years, trenching will be found of great advantage. For Onions the soil should be heavily manured and dug over now and the surface left rough for frost to pulverize it. Onions, unlike most crops, seem to do best on the same land year after year. We have discontinued sowing these outdoors. Our experience of the past three seasons proves conclusively that it pays much better to start the seed in boxes and transplant them in spring. A much heavier and more even crop is secured and no more labor is entailed, all things considered. Danvers Yellow and Red Wethersfield gave us the most even lot of bulbs the past season, although they are smaller than some other kinds. Prizetaker produces extra-fine bulbs, usually of good shape and very solid. I recently saw some specimens of this Onion grown by Mr. A. McIntyre, gardener to Mr. F. N. Washburn at West Harwich, on Cape Cod. Six onions weighed eleven pounds three ounces, the largest specimen tipping the scales at two pounds two ounces. These were grown in sandy soil and liberally supplied with liquid and chemical fertilizers; they were from seed sown the middle of February. Cranston's Excelsior and Ailsa Craig are two English sorts which produce very fine bulbs here and are good keepers.

Brussels Sprouts will stand outside some time yet. We recently broke off all the lower leaves from our plants to give the sprouts more light and air. This desirable member of the Brassica family is being grown more generally as its merits are better known. Cauliflower is still heading up nicely outdoors, but it will soon be necessary to store the heads in cold pits as a safeguard from frost. Parsley and Lettuce have recently been planted in vacant frames for winter supplies, and these are given abundant ventilation on all favorable days. Beets, Carrots, Turnips, Salsify and Parsnips have been lifted and stored in sand in an open shed. A thick coating of dry leaves when colder weather arrives is all that is needed to keep these in good condition during winter. Early Tomatoes in pots now have fruit of a good size, and will commence to ripen early in November. Hand-fertilization of the blossoms during the next three months is necessary to secure a good set of the fruit. A sowing was made early in October, which will give fruit from the end of February onward. Varieties used are May's Favorite, Eclipse and Chemin. The young plants are kept on a shelf close up to the light to make them as sturdy as possible.

Taunton, Mass.

W. N. Craig.

Notes on Violets.

IN the culture of the various forms of the Neapolitan Violet one meets with new experiences almost every year. Perfect success is rarely attained. It can scarcely be said that the best Violets grown are free from traces of disease. One season a stock may be, to all appearance, in perfect health, and the next it will be badly infested, and the same stock will succeed and fail in different places the same year. The Farquhar we hoped much from, but it is badly diseased in some places, and it, therefore, becomes as unreliable as the Marie Louise, which it was expected to displace. It is curious to note in this relation that runners taken from the Farquhar during early summer from plants which were hopelessly lost later in the season, made good healthy specimens the following winter, and stock from these is quite healthy this autumn, while runners from plants which were healthy last summer are diseased this. I have had to fall back upon the more reliable Lady Hume Campbell. It spots badly at times, and, like all other Violets, is liable to attacks of nematodes, a more insidious foe to battle with than the spot, for, unless we are watchful, these are apt to pass into winter quarters unnoticed on the balls of earth

surrounding the plants. The best-looking plants are often most infested with this pest, and it is hard to make people unacquainted with it believe that such plants are useless. They seldom bloom, though holding their leaves well. All old gardens, where a multitude of plants are grown, are likely to have these gall-forming pests in the soil, and they infest vegetables of many sorts. Although this trouble may be perpetuated by dividing plants, it should not be found on runners rooted in sterilized soil. With care in this respect and in selecting a new piece of ground, we were not troubled with nematodes this season, but have had spot badly in place of it. Where Violets are diseased it is hardly necessary to see them to know this is so. An unmistakably unpleasant odor certifies that fact. I have taken in large handsome plants apparently in the best of health which have later become rotten with disease, to put it truthfully. I thought, as conditions were favorable, I would try a change this season. It is a discouraging task to house diseased plants, and I therefore shook all the soil away from the roots, so that, if they started at all, they would start entirely afresh. All are now quite recovered, with healthy deep green foliage and abundant new roots. I must confess to being a trifle jealous of a neighbor's fine lot, and after he had housed the best plants I was thankful to take the leavings, which were far larger and healthier-looking than mine. I planted them in the same kind of soil as my own, so that, if that had anything to do with either success or failure, I should know it. I put them in a separate lot of frames, and now am glad I took this precaution, for the greater part of them are now a mass of decay. I cannot understand what has saved my Violets from disease. The soil they were planted in was wet. If my plants had been better I should have waited for it to dry out enough to handle. I feared failure, and so took all the chances.

Wellesley, Mass.

T. D. Hatfield.

Orchid Notes.—I.

THE season for the flowering of Orchids has begun, and the profusion of bloom now is hardly excelled at any time of year. This autumn display would have been impossible five years ago, and even unheard of. The change is due to the introduction of *Cattleya labiata* and *Dendrobium Phalaenopsis*. *Cattleya labiata* is of the easiest possible culture, and produces, perhaps, a smaller percentage of poor forms than any other *Cattleya*. It stands more exposure to the sun also; the leaves made in Brazil are of very thick texture, and can only be reproduced under our system of cultivating them by free exposure to sun and air during the growing season. This *Cattleya* starts to grow very soon after the flowering is past, and root-action begins at once. If it is necessary to repot the plants, this is best done during the month of December. Last year our plants were all repotted before the end of that month, and out of nearly a hundred not one shows signs of retrogression. As soon as the repotting of *C. labiata* is done, others will need attention. The repotting should always be done when there are signs of fresh root-action. If the plants are growing in pots they should be well soaked in water for a day or two, when the roots will part from the pot easily and with less damage from breaking than if the compost is dry. *Cattleyas* are often grown in wooden baskets, but we have abolished them, and use pots only. If the plants are large the pots are perforated to help aerate the material in which they are growing and keep it sweet. It often half-kills a *Cattleya* to take it out of a wooden receptacle, but if the roots are matted round a pot the pot can readily be broken and the roots detached without great injury. Sphagnum-moss should never be used for *Cattleyas*; it helps to decompose the Fern-fibre and often holds too much moisture when it is not desired. When left out it is almost impossible to overwater a *Cattleya*.

Dendrobium Phalaenopsis will soon be past flowering, when the stems or pseudo-bulbs will show shrinkage, owing to the strain of producing the long sprays of bloom. This must, if possible, be made good before the plants are at rest, or the start made in spring will be correspondingly weak, and there will also be a loss of foliage that should be avoided, if possible. It has been a question whether this *Dendrobium* is deciduous or not under normal conditions. It now appears that, if well managed, the plants will retain most of their leaves through the winter with great benefit to the plants. Sick plants will surely lose all the foliage, and the growth will be weaker in consequence the next year. Young plants made from the portions of old stems must be left on until next March, or when the growth commences, and then placed in small pots. They are worth taking care of, for this is one of the most useful Orchids ever introduced to gardens.

The cool-house plants need attention now, as almost all of

the *Odontoglossums* have begun to grow, and now that the hot weather is past for this year and the temperature can be controlled conveniently, the plants must be encouraged to make all the progress possible. To accomplish this, the roots must first be made comfortable. We use a good portion of moss for cool-house plants, as it is easy to clean away the compost without damage to the roots. As a great quantity of water is needed at all times, and the plants should never suffer for the want of it, there is no better index as to moisture than Sphagnum, which assumes a whitish green as soon as it becomes dry. It is an old saying, with truth in it, that "to be able to grow *Odontoglossums* it is first necessary to learn how to grow Sphagnum-moss." It is customary to pull the Fern fibre to pieces and blend with it about half its bulk of moss. We have found that it is much better to leave the fibre in its original condition and merely shake out the loose earth and use the brown portions. This should be cut into triangular pieces as large as need be; and a few heads of living moss should be inserted between each piece, and it will soon grow and cover the entire surface. It is a serious mistake to use pots too large for the plants, with the idea of encouraging greater vigor by a larger amount of compost. It is an error often made by beginners and cannot be too strongly condemned. The smaller the pot, so that it is large enough, the better the plants will thrive. This is especially applicable to *Odontoglossum crispum* and its allied kinds. *O. grande* is now in bloom and is a very useful plant for decorative purposes at this season. It is of Mexican origin and in winter needs a warmer house than the cool house proper, where it thrives well in summer, and even in a shady place out-of-doors if moisture is abundant. It is well to give water all winter at regular intervals to keep the bulbs plump. *O. grande* is one of the kinds for many years reputed to be hard to keep in good condition; with rational treatment we have found that it is not difficult to grow, but the strain of blooming every year is great, and it is economical to let each plant flower but once in two years. They are easily procured at a nominal price.

Cypripediums of the *Insigne* type were all out-of-doors from the end of May until the end of September. The pots were plunged in a spent hot-bed under the shade of Elm-trees. The sashes were taken off and the plants sprinkled overhead on hot days. This method has been practiced for several years with good results. The plants flower freely, have a deep green color, and are not forced to make growth at the expense of flowers, as is often the case when the plants are kept in the greenhouse during the hot months. After the flowering is past the plants are rested in a cool greenhouse for a month or two until March, and renewed root-action takes place, and if repotting is necessary it is then done. Cypripediums of this type do not readily come out of the pots when they are full of roots. It is better to break the pots rather than the roots. If the plants are in large pots and it is not desirable to have them larger, they can be maintained in good health for a number of years by giving a little stimulant in the water, such as a very weak solution of sulphate of ammonia or nitrate of soda, or, better still, both at alternate waterings. The invention of the Kenney pump has greatly simplified the application of all liquid stimulants. A strong solution is made in a convenient vessel, and in the use of the pump the solution is blended with the hose supply at any desired strength by diaphragms of various sizes. The temperature can be regulated also by mixing the solution with water warm enough to take the chill off the water as it comes from the main. An invention so inexpensive ought to be better known.

South Lancaster, Mass.

E. O. Orpet.

Notes on Irises.

THIS being the only season when many of the Irises are offered by the dealers, it seems a good time to answer some inquiries as to their collection and culture. As there are nearly 200 known species of Irises, or 250 including the Cape and south African forms, which are classed by the botanists as *Moræas*, with an endless number of varieties, it is scarcely possible to generalize about the family without some eliminations. Dismissing the *Moræas*, suitable only for greenhouse culture, we have a large genus of plants native of the north temperate zone, and with comparatively few exceptions hardy in this latitude. The exceptions are mostly among the bulbous Irises, which, like *Iris alata*, *I. juncea*, *I. Tingitana*, etc., naturally making growth in winter, have their foliage so injured if exposed that they cannot recuperate. Yet other bulbous Irises, as the *Reticulata* section (except *I. histrio*), thrive under the same conditions, their foliage not suffering from frost. The hardiness of the rhizomatous Irises depends, with

a few exceptions, on their being suitably planted and well established.

The time of planting, as has been lately noted in GARDEN AND FOREST, is an essential point with some few species like *I. Hartwegii* and *I. Macrosiphon*, whose habits are peculiar, owing to climatic conditions in their natural homes; and there are some central Asiatic kinds of *Oncocyclus* and *Regelia* classes which require special annual treatment. But taking the rhizomatous Irises as a class they may be moved at any time from one part of the garden to another, or from a neighboring garden, if in a growing condition and the ground is not very cold. They seem, as a rule, to endure removal best just after flowering, when a new growth commences. But to establish the same Irises received from a long distance at the beginning of cold weather is another and more difficult matter. The Irises from a distance will have usually come to a complete state of rest, and neither their roots nor leaves are in a condition for action. Often from a distance one receives mere withered rhizomes. To expose such plants to outside conditions is, of course, to invite destruction, for they are practically lifeless masses of albumen. Such dormant pieces should be carefully planted in a frame or cool house, with the rhizomes, if stout, only partly buried and kept cool, but free from frost and rather dry. Under such treatment they will usually revive in due season, and in the spring can be transferred to the borders with safety. Irises like the sun, and it is important that the fast-creeping rhizomes of such as the German Irises should be in a position to be ripened by the sun and kept from overshadowing grasses and weeds. These rhizomes naturally creep at the surface. Other Irises, such as *I. cristata*, send their thin rhizomes just under the surface, and the soil in which they are planted should be open and adapted to such growth. Still another class of Irises, as *I. Sibirica*, *I. ensata* and the Japanese Irises, are furnished with many fine roots and comparatively small rhizomes, and may be planted like any hardy perennial, with no special care for the rhizomes. Irises of this class may be more highly fertilized than the others, the Japanese Irises especially requiring high culture in this particular. Most of the Irises enjoy liberal supplies of water when growing, and often have considerable adaptability, thriving in wet or dry situations. The well-known subaquatic, *I. Pseudacorus*, thrives equally well on the upland as when its feet are in water.

The bulbous Irises with annual roots, the *Reticulatas*, the Spanish and the English, are better lifted annually, as they naturally are dormant in summer, and may be injured in wet weather. But those with fleshy persistent roots, known as *Junos*, of which *I. Persica* is a type, are best left undisturbed. These thrive best in a rather heavy soil in a southern exposure, rather protected, as they flower early.

Among so many plants it is difficult to advise a beginner as to a selection, but as a start, and avoiding rare sorts, a fair representative list may be made up of the following kinds, named nearly in the order of their flowering, and none of which offer any difficulty in cultivation: *Iris orchoides* is a very distinct bulbous Iris with beautiful golden flowers, and quite the earliest showy species. After this the dwarf Irises will soon flower, white, yellow and purple forms of *I. pumila*. Then taller forms, such as *I. Chamæiris* and *I. nudicaulis*. The bulbous Spanish and English Irises follow in succession, the former showing leaves in winter and requiring liberal supplies of water when growing. *I. Sibirica*, in several purples and a white form, are also early. The mid-season display of Irises is made by the showy hybrid German kinds, offered in great variety. From a florist's list, if properly described, one may select a dozen kinds, giving a fair representation, to which additions may be made later. *I. pallida* should not be omitted from any collection. For the later season the main reliance is on the Japanese varieties of *I. lævigata*, a dozen or so kinds giving a fair representation of the colorings. This is only a small collection, but I refrain from mentioning many beautiful kinds which many will be glad to add as they discover the unfolding beauties of these flowers.

Elizabeth, N. J.

J. N. Gerard.

Experience with Summer-flowering Plants.

IN well-ordered flower gardens north of the fortieth parallel the plants used for summer decoration have been safely housed before this date, and the planting of hardy bulbs is in many instances completed. The experience of the past season may prove helpful in planning next year's operations. Outdoor Roses in the vicinity of Philadelphia have been satisfactory in most instances; the benefits of thorough watering in dry weather and mulching the beds have again been proved.

Even where this extra care was not given, the growing weather of the latter part of the summer induced quite strong growth on established Roses. In a neighboring garden some plants of General Jacqueminot, Ulrich Brunner and Mrs. John Laing bore stout canes from five to six feet tall, which seemed to be ripening up nicely. La France is a general favorite in this locality, and is seldom entirely without flowers from June to the end of November, and in favorable seasons even later. This Rose is not injured severely by the winter here, except in very exposed positions. Hermosa is seen in most gardens, but is frequently winter-killed to the ground. It could probably be carried through in much better condition by laying down the shoots and burying the whole plant in earth. Crimson Rambler has not yet been generally planted in this locality, and the plants used were quite small, so that its full beauty has not yet been seen; there appears to be no question as to its hardiness. If we can grow this Rose to the same perfection that it has been grown during the past summer on some of the noted English estates we have something worth looking forward to. On one place in England a high fence was covered with a mass of Crimson Rambler to a height of eight or nine feet, and was a perfect blaze of color.

Eckford's Improved Sweet Peas have been eminently satisfactory with us the past season, having grown fully six feet high where they were provided with a support of galvanized wire netting. They were covered with bloom from June 30th until frost. They were sown in drills and covered with about two inches of soil, the only fertilizer being a small quantity of chicken-manure worked into the soil before the seed was sown. During dry weather they were thoroughly soaked with water twice a week. Spikes bearing four flowers were not unusual. A bed planted with Canna Egandale and surrounded with a border of Abutilon Souvenir de Bonne occasioned much favorable comment. This Canna is one of the most floriferous varieties I have seen, the spikes large and branching and the color bright red, while its bronzy foliage contrasts admirably with the white variegation of the Abutilon. The newer Abutilon, Lavitzi, is said to be an improvement on A. Souvenir de Bonne. It has not yet been tested as a bedder here, having but recently been offered for sale in this country. Many of the Abutilons are available for bedding purposes and especially adapted for large beds, producing rich effects both in foliage and flowers.

Sanchezia nobilis has appeared to good advantage the past summer planted out in the full sun, having leaves fully one foot long and handsomely veined with bright yellow. The *Hydrangea* season was cut rather short in this section by a severe hot spell just as the flowers were opening, but the after-colors of the trusses on *H. paniculata grandiflora* have been very attractive, and show once more the value of this plant in the autumn-color scheme of the garden. *H. hortensis* is sometimes partly winter-killed in this vicinity unless it is given slight protection. A little further south it does not appear to suffer to any great extent. Some of the finest specimens I have seen were in Wilmington, Delaware, where it seems to be planted quite as freely as *H. paniculata grandiflora*, and produces immense trusses, the majority of which are tinted blue.

Holmesburg, Pa.

W. H. Taplin.

Coriaria Nepalensis.—This is certainly a charming plant. From a woody root-stock numerous twigs push up in spring. These are clothed from bottom to top with alternate heart-shaped bright green leaves, each about an inch across and set close to the stem. The plant thus forms a cheerful-looking bush three feet in height. The flowers appear in graceful nodding spikes at the end of each twig and are insignificant. Later, they rapidly develop into beautiful fruits of a bright deep yellow color, hanging from the twigs like currants. Imagine a small bush with bright green leaves, supporting a dozen of these nodding spikes six to eight inches long, each spike carrying about fifty of the small shining fruits of a deep crystalline yellow, and you may get some idea of its striking beauty. It is quite hardy here, and during summer new shoots are constantly coming on, so that its bright fruits are seen until November.

Baden-Baden.

Max Leichtlin.

Late-flowering Begonias.—A recent allusion in GARDEN AND FOREST to the pretty little autumn-blooming *Begonia Natalensis* reminds me to say that it is establishing itself, as *B. Evansiana* has done, under the benches in the greenhouse, where both make the very best kind of a screen. *B. Socotrana* is another of these fall-blooming species, bulbous in character and especially distinct. The

leaves are peltate and the much-branched panicles bear lovely carmine-pink flowers. It is more useful for cutting than the commoner tuberous kinds, since the female flowers are numerous and persistent. It is seldom one sees it as well grown as recently in a Massachusetts garden, where one whole side of a small greenhouse was made radiant with them. Gloire de Lorraine is a new Socotrana hybrid, and one of the prettiest we have seen. The flowers in form and color resemble those of B. Socotrana. The leaves are more irregular and the habit quite shrubby.

Wellesley, Mass.

T. D. Hatfield.

Correspondence.

Notes from Germantown.

To the Editor of GARDEN AND FOREST:

Sir,—Just now the grounds here are singularly beautiful with autumn foliage and bright fruits. Individual trees of the American Hornbeam vary greatly in the autumn coloring of their leaves, but in large collections some of them are a flaming red. The European species hardly color at all here. About Germantown the Liquidambar, or Sweet Gum, is now surprisingly beautiful. It delights in a situation where it can have full sunshine, and it ought to be in a damp place to insure its best growth and richest color. The Japanese Snow-ball, *Viburnum plicatum*, has been largely planted for its flowers, but it has a variety known here as *rotundifolium*, which is now strikingly handsome. The plant blooms rather earlier than the type and its flowers are rather larger, but at this season the leaves turn to a singular yellowish scarlet and give it a high value among shrubs used for autumn color.

The leaves of *Photinia villosa* turn to a bright scarlet, but in well-established plants the fruit is also very showy at this season. The berries are not large, but they are very abundant, and they ripen to a deep scarlet and remain in this condition for a considerable length of time. Our common Chokeberry, *Pyrus arbutifolia*, is an attractive shrub in spring for its clusters of white flowers, but it is equally beautiful in autumn when covered with its clear red fruit. It is one of the plants that improve wonderfully under cultivation, and one who has only seen it in the woods will hardly recognize it when planted in good rich soil and well cared for. It becomes a compact bush and produces fruit much more freely. This is also true of our wild Roses, *R. Carolina* and *R. lucida*, which, when cultivated, are loaded with their bright hips. This year they have outdone themselves, and their branches are fairly weighted down with fruit.

The violet-colored berries of *Callicarpa purpurea* are now very striking in plants which have been properly treated—that is, when placed in an open situation in damp rich soil and cut nearly to the ground in spring. This compels them to throw up strong shoots which are now loaded with fruits. *Lycetia Formosa* is still showing its pendent racemes of reddish berries and is a first-rate ornamental shrub, although it is somewhat tender here. Its tips winter-kill, but when it is cut back it flowers freely in late summer from the shoots it throws up from below. The creeping *Daphne*, *D. Cneorum*, is in flower from spring to fall, and just on the verge of freezing weather it seems to be as full of bloom as ever. Its roots are very slender and they seem to like to wander in light soil and can find nourishment in almost clear sand. The flowers when cut now display their characteristic odor.

Germantown, Pa.

Joseph Meachan.

Smilax for Florists' Use.

To the Editor of GARDEN AND FOREST:

Sir,—In your excellent article on the "Change of Fashion in Flowers" you omitted to speak of *Smilax*, *Myrsiphyllum asparagoides*, and I beg the privilege of calling your attention to it as a plant of comparatively recent discovery for florists' use. It was in the early seventies that *Smilax* first came into prominence for use in cut-flower work. Its use in festooning the handles of baskets, filling in bouquets, and the ground-work of baskets of flowers was one of the most potent factors in changing the set, stiff arrangement to the natural and graceful manner that obtains to-day. Long before its introduction, fault was found with the prevailing method of arranging flowers, but the material was not at hand to effect the desired purpose; *Smilax* supplied the want, and so the florists were enabled to make light, graceful bouquets and baskets.

It is interesting to note the rivals which have arisen in opposition to *Smilax*. First, the Climbing Fern, *Lygodium scandens*,

then *Asparagus tenuissimus*, and later *A. plumosus*, the first two having passed out of existence because they wilted too rapidly after being cut, but the third mentioned has obtained a foothold and divides the field with *Smilax* to-day. Maiden-hair Fern, *Adiantum cuneatum*, has also been called into use for many purposes for which *Smilax* was originally used, and so, while the quantity of *Smilax* grown is getting larger annually, because of the increased market, yet its development is not in proportion to the market because of the place filled by other plants.

New York.

Patrick O'Mara.

Orchids on Mount Desert.

To the Editor of GARDEN AND FOREST:

Sir,—I found two interesting Orchids abundant in woods and fields of Mount Desert in early October. The first is *Good-yea repens*, more commonly called the Rattlesnake Plantain, with curiously reticulated white-veined, blue-green, velvety leaves and slender greenish flower-spikes and dainty cream-colored, waxy flowers. The plants were thickly set among trailing Snowberries, shining Mitchells and yellowing Ferns, and wearing that air of aloofness which distinguishes all Orchids from the cheerful familiarity of Asters and Golden-rods. The author of *Orchids in New England* says he seldom sees the Rattlesnake Plantain in flower, and cites an experienced botanist who had searched in many different places and never came across a flowering plant in three years; but I found them on the island flowering in great profusion. I was fortunate, too, in transplanting them not only into window-boxes and baskets, but into the shady corners of a garden, where they have rewarded me by flowering bountifully.

The second autumnal Orchid, *Spiranthes cernua*, Nodding Ladies' Tresses, is much more conspicuous and more positively beautiful. In the meadows of eastern Massachusetts I have often seen it close to the exquisite blue-fringed Gentian. Although most common in damp meadows it sometimes grows on uplands among Pennyroyal and Sweet Fern, or makes a conspicuous setting for the purple cross-leaved Polygala. The very roadsides in some parts of Mount Desert are white with their flowers, and the honey bees find them delightful to the very last day of their existence and often follow them into a sunny room, where, in water, they last for a fortnight, and if set against a background of brilliant Maple-leaves, the gleaming berries of the Hobble-bush or Wild Mountain Ash, they are charming indeed.

Andover, Mass.

Annie Sawyer Downes.

Recent Publications.

How Birds Affect the Farm and Garden. By Florence A. Merriam.

This is a little pamphlet of thirty odd pages, which sets forth, as the sub-title announces, a series of facts determined by investigation of the food habits of our common birds, showing their character as insect destroyers and their value as allies of the farmer and fruit grower. There are many sentimental reasons which can be urged against the slaughter of birds which do so much to enliven our landscapes with their beauty of form and color and their grace of movement, and to fill the air with their melody. These reasons ought to suffice to make every woman of sensibility shudder at the thought of being in any way a *particeps criminis* in the murder of these innocents for the sake of their plumage for the ornamentation of bonnets. There are economic considerations, however, besides the others, and the studies of ornithologists have demonstrated that our song birds and, indeed, all except the English sparrow, are essential to prosperous agriculture and horticulture for their aid in suppressing noxious insects. Miss Merriam has brought together a great mass of testimony collected by the Division of Ornithology at Washington, and by naturalists in the various experiment stations, who have been studying the relations of birds to insect life, to show how tirelessly and efficiently these allies of man help to protect his fields and gardens and orchards and vineyards from insect ravages. The paper was originally published in *Forest and Stream*, of this city, and it will be supplied for distribution from that office at cost. Single copies of the pamphlet can be had for five cents, and it ought to be placed where every farmer's boy in the country can read it.

Notes.

The orange crop of Louisiana is estimated at 20,000 boxes, a slight increase over last season, and about one-seventh of the output previous to the damage by freezing two years ago.

Mr. J. H. Maiden has been appointed Government botanist and director of the Botanic Garden at Sydney, in succession to Mr. Charles Moore, who has recently retired after a service in these capacities of nearly half a century.

Last week the American Gardeners' Society was organized at a meeting held in Madison Square Garden, with J. M. Hunter, Hempstead, Long Island, President; Wallace G. Gomersall, Fishkill-on-Hudson, New York, Vice-President; James I. Donlan, New York, Secretary, and R. Butterbach, Oceanic, New Jersey, Treasurer. The purpose is to establish branches of the society in various sections of the country; its future course, however, can hardly be predicted until it is in more complete working order.

A Florists' and Gardeners' Club has recently been organized in Morris County, New Jersey, with A. Herrington, gardener to H. McK. Twombly, as President; W. Duckham, gardener to D. Willis James, as Vice-President; William Charlton, Treasurer, and William H. Thomas, gardener to A. P. Whitney, Secretary. The club consists at present of about forty members. The monthly meetings will be held in Madison, with an exhibition in the Lyceum at Morristown on November 10th, 11th and 12th. Several gentlemen with large estates have promised the project their hearty support.

We learn from the *Public Ledger*, of Philadelphia, that a well-known Pecan-tree, said to have been the product of seed brought to Germantown by Nuttall nearly a century ago, and probably the first specimen of its kind planted in this part of the country, is to be cut down. The tree had grown to a great height and was one of the most famous in Germantown, where famous trees abound. It is located on what is now the grounds of a new Methodist Episcopal Church, and when the land was purchased it was decided to save the tree, for which purpose the architect designed the building so that it could be left standing. Recent heavy storms, however, have caused the tree to lean heavily toward the church wall, so that damage is threatened to the structure and orders have been given to have it removed.

What is really a manual of practical entomology has been issued by the West Virginia Experiment Station as Bulletin No. 44. It explains in a popular, but accurate, way how to determine whether any loss or injury to crops of farm or garden is caused by insects and how to detect the special insect which causes it. The insects themselves are briefly described, and the best defenses against them, so far as known, are plainly stated. The bulletin can be used as an elementary guide to the study of common insects and the character of their work, and it will be useful for busy farmers and gardeners who want a handbook of reference which contains plainly stated information about the more important features of insect-life and its relations to plant-life. The bulletin was prepared by Dr. A. D. Hopkins and W. E. Rumsey.

Delaware and Niagara grapes are less plentiful and less evenly good than those of the other well-known varieties, and the best bring twenty and twenty-five cents for a small basket. Concord and Catawbas, fresh and sound, are now selling at retail for ten cents for a basket weighing four pounds, and eight-pound baskets of Concord of the same high quality may be had for fifteen cents. These prices must mean not only small margins for the wholesale and retail city dealers, but very meagre profit to the cultivator. Kelsey plums, large, firm and beautifully colored, are still seen in collections of choice fruits, and command seventy-five cents a dozen. Hot-house tomatoes, from the interior of this state, are selling for fifty to sixty-five cents a pound. Sugar-cane, from Louisiana, is seen in some of the fancy-fruit stores, the long stalks selling for five cents each.

We have received the first number of *Florilegium Harlemense*, an illustrated work on cultivated bulbous plants, published under the auspices of the council of the Algemeene Vereeniging Voor Bloembollencultuur. The work is of quarto size, and the flowers of natural dimensions, printed in colors on a rather light brown paper. The first plate contains the Single Hyacinth, La Grandesse, which, although it was distributed more than thirty years ago, is still the best trade variety of this color. Plate No. 2 contains four Tulips, among which is Keizerskroon, said to be the oldest early Tulip grown, and under the name of Grand Duc it was listed in catalogues 150

years ago. The other Tulips are White Pottebakker, Vermilion Brilliant and Proserpina. Plate No. 3 illustrates three varieties of *Narcissus Pseudo-narcissus*: Major Maximus, Bicolor John Horsfield and *Moschatus albicans*. The text is written in French, English, German and Dutch.

Another study of the destructive Potato scab has been made at the Agricultural College of South Dakota by Thomas A. Williams, botanist of the experiment station there, and the report has been recently issued in a bulletin. When the seed is treated with corrosive sublimate and planted in uninfested land no scab was found, and when planted in infested land the same treatment very materially reduced the trouble. The weaker solution, where the corrosive sublimate is used with the strength of about 1 to 1,000, is about as effective and needs less care than when it is six times as strong. The best practice is to immerse the seed before it is cut. The Bordeaux mixture and the so-called Eau Celeste seemed to be effective against the fungus, but it decreased the yield more or less. One point noted was that the thicker-skinned and darker-colored varieties of potatoes seemed better able to resist the attacks of the disease than other ones, and it was once more demonstrated that potatoes should not be allowed to remain in the wet ground long after ripening.

Several new seedling Carnations are now offered by up-town florists, notably Nero, large, clear rose-pink in color, and conspicuously attractive, and Nellie Patterson, with a variegation more showy, perhaps, than even Helen Keller. The flowers are a rich cream-yellow, the fringed petals delicately bordered and regularly striped with bright pink. Both these novelties came from C. Besold, Mineola, Long Island. Masses of beautifully grown *Chrysanthemums* in florists' windows include among yellow sorts H. L. Sunderbruch and a new seedling of decided merit from Dailedouze Brothers, which they have named Gold Standard. Flowers of the white Mrs. Henry Robinson are altogether the largest and handsomest *chrysanthemums* now in season, but none are more beautiful than Pink Ivory, the petals deepening in color from the tips to a delightful rich pink at their base. Large plants of heavily fruited *Otaheite Oranges* are highly decorative features among the plants, and luxuriantly flowered *Ericas* are seen in compactly grown plants of *E. præstans*, with white flowers; *E. campanulata*, tall and slender in habit, with brilliant red, trumpet-shaped flowers, *E. hyemalis*, pink-flowered; and *E. gracilis vernalis*, bright red globular flowers.

In a paper read before the meeting of the Association for Economic Entomologists at Buffalo, last summer, Professor Hopkins gave an account of certain studies at the experiment station in West Virginia, looking toward the prevention of injury to shade and forest trees by insects. In one interesting series of experiments different kinds of trees were cut twice every month, year after year, in order to gather evidence as to the proper time for felling timber so as to secure the least possible damage from insect attacks. By observations with an insectary in which hundreds of specimens of insects, representing many different species, were introduced, it was found, among other things, that Hickory and Oak when cut in the winter months is converted into powder by *Lyctus striatus*, while the same wood cut during the summer months is only slightly damaged. In the same way it is found that certain species of trees cut in July and August are entirely exempt or but slightly damaged by wood-boring insects, while those cut in late autumn or early spring are seriously injured. Professor Hopkins found that a slight injury to the base of a tree by fire offers a most favorable condition for insect attack, which often results in the destruction of the most valuable wood of a tree. The fire burns and kills the bark on one side of the base, which might not be a serious matter of itself, since subsequent growth would heal it over, but these slight wounds are soon infested by various beetles and their larvæ, which by boring convert the inner dead wood into a dry powder, or else their mines afford entrance for the fungus, so that the next fire finds in these wounds a most favorable condition to extend the injury. In this way frequent fires in the same forest often burn entirely through the trunk of a large tree. Fire wounds are almost invariably followed by a decay of the heart-wood, which results in a hollow trunk. In almost every wounded tree which was cut down and split open it was found that the extension of the decay was due largely to insect larvæ which had entered from eggs deposited in the edges of the fire wounds, and that brood after brood of these larvæ, aided by wood-infesting ants, had completely honeycombed the heart-wood for a great distance above the wound, thus rendering it worthless. The paper throughout is very interesting.

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Forests and Floods.

IN the first number of GARDEN AND FOREST, published nearly nine years ago, there appeared an article by Francis Parkman on the forests of the White Mountains. He showed that these mountains owed the greater part of their charm to the primeval forests that still covered them, and that they brought to the state of New Hampshire a sure and abundant income by attracting tourists and their money. He added that if the speculators who had their eyes on these forest-lands were permitted to work their will the state would find its most remunerative property sadly lessened in value, and that the mountains, when robbed of the woods, would become, like some parts of the Pyrenees, desolate, inhospitable and unfrequented. He added that the preservation of these woods would save the streams which flow from them, especially the Pemigewasset, the main source of the Merrimac, from the alternate droughts and freshets to which all streams are exposed when the mountains in which they take their rise are denuded of their forests. The final sentence of his article was: "This subject is one of the last importance to the mill-owners along these rivers."

During the present month, at the annual meeting of the Amoskeag Manufacturing Company, in Manchester, New Hampshire, the report of Hon. T. Jefferson Coolidge, the treasurer, was read. He spoke of the ruin caused by a flood in April, 1895, when the water rose to a height never known in the Merrimac River before that day. The water ran ten feet deep over the great dam, which was so seriously injured that it took all summer to repair it and replace the granite blocks and columns under the gate-house. But for these repairs the entire dam and the gate-house would probably have been swept away by the torrent which rushed over it on the second of March, 1896, when the water rose a foot and a half higher than it did in the previous spring, carrying away bridges and compelling the factories to stop work and leaving six thousand operatives without employment. Mr. Coolidge added that the only explanation, in his judgment, for the increasing violence of these floods was the cutting down of the forest about the headwaters of the Pemigewasset and other affluents of the Merrimac. The result has thus emphasized the warning

to mill-owners sounded by Mr. Parkman and other forward-looking men years ago.

Of course, there is a great deal of misinformation published every year in regard to the influence of forests on rainfall, but no fact in physical science is better established than that the cutting away of timber on high mountains and their slopes is the cause of great variation in the water-flow. The rainfall and melting snows are hurried away more swiftly from highlands on which there is no forest cover, and so the high water becomes an inundation and a calamity, while the extreme low water which follows is almost as much of a calamity. This is not a matter of theory, although the reasons are evident and have been frequently stated in these columns and elsewhere. It is the experience of the Old World which is being repeated in the New, and disasters of this sort will be more frequent and more lamentable unless the safeguards which nature has furnished are respected and preserved. Mr. Coolidge did not state the case too strongly when he said that if the present practices are continued, manufacture by water-power of the Merrimac will become impossible in New Hampshire. No new mills will be put up, the old ones will be driven to the use of steam, and, therefore, they will be put to a great disadvantage in competition with other cities where coal does not need to be transported so far. Certainly the situation justifies Mr. Coolidge's earnest appeal to every one who has the prosperity of New Hampshire at heart to exert his utmost influence to induce the Legislature of that state to protect the forests which still remain.

It is unpleasant to be constantly sounding alarms and predicting calamities. No gift of prophecy is needed to foretell the ruin which will follow if the devastation of the forests of the Appalachian region from Quebec to Alabama goes on for the next twenty-five years as it has done. And who can estimate the desolation which will ensue if the floods are let loose from the still loftier ranges which feed the Columbia, the Sacramento and the San Joaquin, or who can imagine the extent of the inland sea that will roll over the Mississippi valley when the water barriers are removed from the eastern slopes of the great Continental Divide and the sources of that immense water system in the central north? Common prudence ought to arouse the legislatures of the various states and of the nation to face this problem now, which is of more vital importance to the life of the Republic than any question of tariff or of currency.

DR. AUGUSTINE HENRY, of the Chinese Customs Department, well known to all lovers of plants from his many botanical discoveries in central China, is now stationed at Mengtse, in Yu-Nan, situated in an elevated plain 4,500 feet above sea-level and surrounded by mountains reaching an altitude of 8,000 or 9,000 feet. The principal trees of this region, Dr. Henry writes us in a personal letter, are *Quercus* (four or five species), *Viburnum* (three species), *Hydrangea* (one large tree and three or four shrubby species), *Sambucus*, *Rhododendron* (two arborescent species), two large arborescent species of *Aralia*, ten species of *Rubus*, two of *Roses*, four or five species of *Pyrus*, and *Fatsia papyrifera*, the Chinese Rice-paper plant, growing wild. Near the summit of the mountains growing in the forest are *Elelostemma*, *Panax* repens, three species of *Polygonum*, *Thalictrum*, *Valeriana*, *Lilium giganteum*, four or five *Labiatae*, two or three *Cyrtandreae*, etc. On lower levels what is probably a distinct species of *Pyrus* and an *Abies* resembling *Abies Davidiana*, *Gleditsia Delevayi*, with enormous pods, a tomentose *Fraxinus*, *Albizia*, *Dalbergia*, etc., are found. One hundred and thirty species of Ferns have already been collected in this region by Hancock, ten of them being undescribed species. Dr. Henry writes:

I anticipate that I shall make a grand collection here, as the country is very varied. Only two days off one descends into the tropical valley of the Red River, so there is every kind of climate close at hand. The endemic species are, I think,

numerous, and include many ornamental things. The Orchids growing in the mountain grass are very numerous, indeed, and there is a larger proportion of petaloid monocotyledons than I have seen elsewhere. There seems to be a very distinct edible apple, not yet ripe, which is worthy of note. I find the Peach wild in the ravines, with inedible or barely edible fruit. *Rosa gigantea* is very common, and must be a glorious sight when in flower. I have been particularly struck by the absence of Laurineæ, which are so conspicuous in the Hupeh flora everywhere. I notice one *Acer* on the mountain summits. Besides *Lilium giganteum* there are two other Lilies, one resembling *L. longiflorum*, but distinct, and the other a yellow Lily, not very large, but pretty. It is also something new, I believe.

In addition to these interesting botanical features the ethnology of the people is most interesting. The people are largely of three races (non-Chinese), Shan, Lolo and Miao-tse, but in the mountains one comes across diminutive people living in squalid villages, cultivating only Buckwheat, pasturing sheep and cattle, and these folk are practically savage autochthons. Pure Lolos are handsome and of Caucasian type in some respects. Of course, these are only my hurried impressions, as I have been here only a short time and have only been in certain parts of the neighborhood.

Baden-Baden.

IN a late issue of *The Gardeners' Chronicle* Rev. Henry Ewbank gives an account of the famous gardens of Baden-Baden, which have been enriched by the business enterprise, the enthusiasm and the rare cultural skill of Herr Max Leichtlin. These gardens have been for many years one of the great European centres of horticultural interest, and our readers will thank us for presenting an extract from Mr. Ewbank's interesting letter.

The Kniphofias are such as I have never seen elsewhere. *K. Nelsoni* is of great value, because it blossoms the latest of all, and it is certainly one of the loveliest and most elegant of them. *K. Natalensis* is the most highly colored of the lot; *K. Triumph* has a kind of bright yellow candelabra-like habit of flowering; and a small yellow one which is not very tall, and has not as yet been named, struck me as certain to please. But, perhaps, I may as well say at once, that the most striking plant in the garden just now is *Coriaria Nepalensis*—it was so entirely new to me. Max Leichtlin says it has been in full beauty since last July, and is likely to be so till the frost sets in. The crystalline, deep yellow fruit is attractive in the highest degree, and when the statement is added that the shrub is quite hardy in this part of the world, it will be seen that this acquisition from the Himalayas is of great value, and will be much sought after.

There was a new *Hedysarum* in the borders which I liked very much; *Trachelium rumelianum* is a nice little flower, and I saw many specimens of *Campanula mirabilis*, of course not in blossom just now, from which great things are expected. *Liatris cylindracea* is still very fine, although far from its best; I think it is *L. graminifolia* that Leichtlin praises the most, but its time had gone by. *Thalictrum Delavayi* has no need of mention from me, but I never saw such fine specimens as there are here, and there seem to be two varieties which differ very much in the foliage, but are in other respects alike. Some *Lobelias* are still very attractive. *L. fulgens rosea* and *violacea* correspond with their names, and they brighten up the borders exceedingly; they differ from what I have as yet come across. *Calceolaria alba* should not escape notice; it will be a valuable little shrub if only it is sufficiently hardy. In one of the houses I saw an *Agapanthus* which throws all others into the shade; it rejoices in the name of *A. maximus*, var. *Krelagei*, and while any *Agapanthus* is good, this must be put in the first rank of all where autumn flowers are looked for. Close by it was a very large *Belladonna Lily*, *Amaryllis Belladonna rosea perfecta*, a beautiful thing in its way. *Sternbergia macrantha* is in all its glory at present; I suppose it is one of the finest of Mr. Whittall's many introductions—the only drawback it has is that it is naked-stemmed and blossoms without the leaves. *Gerbera Jamesoni* seems to be quite at home with Max Leichtlin, though it is strange to hear from him that it has not done well lately in the way of blossoming, because of the continuous wet. I have a plant at Ryde which must be four or five times as large as any which are here; and though very robust and strong, it did not blossom well this summer in one of the hottest and driest places that could be conceived. If sunshine in one locality puts it out, and rain in another, what are we to do with it? My plant did

splendidly in the summer of 1894 and 1895, but it has quite failed this year; and I hear from my gardener that it has done nothing since I left home, some six or seven weeks ago, though it is in a very robust and healthy condition.

Scabiosa Hookeriana is a novelty which has seen its best for this season. I think Max Leichtlin said it had been a puzzle to him for fifteen years. He has two or three good *Delphiniums* which have not as yet found their way into commerce; one is a sort of dark claret color, which had not at all begun to fade. I noted flowering plants of *Galanthus Olgæ Reginae*, but it is nothing more than *G. nivalis*, with a very precocious disposition, which makes it outstrip all its compeers in earliness; it is, nevertheless, well worth possessing, for by its aid all lovers of Snowdrops (and who is not a lover of Snowdrops?) may cover three out of the four quarters of the year with their favorites, and only be without them when there is quite a glut of other flowers. Old friends turn up here in multitudes, though I miss a good many of those which I have known before. *Onosma albo-roseum*, *Omphalodes Luciliæ*, *Polygonum spherostachyum*, *Arnebia echioides*, *Pelargonium Endlicherianum*, *Primulas* without number; *Aubrietias* and such like plants abound on every hand. There is an *Aubrietia* which I want some day to see in blossom very much, for it is called the Beauty of Baden; and if it be that, what a beauty it must be!

The American Persimmon.

AT this season of the year the native Persimmon of the United States is in the perfection of its fruitage. While our city markets know in a limited way of the Japanese persimmon, as grown in Florida, California or the south-west, the American persimmon is comparatively unknown, excepting in some of the larger southern markets, to which the farmers bring it in limited quantity. The American persimmon is not in favor, as commonly known, because of its astringent or puckery skin and because its extreme softness when fully ripe makes it difficult to handle and ship. As a consequence, thousands of bushels rot on the ground every year or are eaten by hogs in pasture.

In the Mississippi valley, from central Indiana and Illinois, southward, the Persimmon may be generally found growing with great vigor. In some regions it is regarded as an intruder, and the trees are classed as almost as worthless as *Sassafras*-sprouts. It has, however, the merit of producing a fruit which, it is safe to predict, will some day be a popular article of diet on our tables. An examination of the seedling wild fruit shows a wide difference in form and quality. Forms range from round to oval, with varying degrees between, as round-ovate, oblong-ovate, roundish oblate, etc. The fruit from some trees contains many seeds, while others are seedless. With some the pulp is very sweet, rich and appetizing, with the skin comparatively free from astringency, while others are inferior in quality and most undesirable.

The Indiana Experiment Station, through Professor James Troop, the horticulturist, has been giving special attention to the native Persimmon. Many varieties of seedlings have been collected in southern Indiana, and numerous persons have sent us samples of fruit that they regarded as of special merit. Some of this fruit has been delicious, and I am sure would find a ready sale in a city market when its merits once became known. The following varieties are described by Professor Troop in Bulletin 60 of the Indiana Station: Shoto, Early Bearing, Golden Gem, Daniel Boone, Hicks, Kansas, Smeech and Early Golden. All of these have fruit of special merit. Golden Gem was introduced by Mr. Logan Martin, of Clark County, Indiana, and is grown by him for near-by markets. A quantity which he sent to this station was regarded by all who ate of it as most delicious. The fruit is roundish oblong, about an inch and a half or more in diameter, dark orange to red in color, contains but few seeds, and the flesh is soft, rich, sweet and palatable, being quite free of any astringency. This variety commences to ripen about the last of August and continues until October. Shoto has a large fruit, oblong-ovate in form, has but few seeds, and the pulp is of good quality, being in its prime in October.

Hicks has a large fruit of excellent quality, containing but few seeds. Early Bearing also produces a fruit of good quality. Generally speaking, the fruit is improved by the action of frost, which seems to destroy the astringency.

A special study of the composition of the fruit has been made by Messrs. Huston & Barrett in our chemical laboratory, and the published analyses in Bulletin 60 of the Indiana Station are the only ones extant, so far as we know, showing the composition of persimmons. Five samples of wild fruit and one of Golden Gem were analyzed. It was found that the amount of dry matter in this fruit was greatly in excess of that in other fruits. Grapes contain from 8 to 24 per cent., while in the persimmons analyzed, the dry matter ranged from 29 to 48 per cent. A special study of the pulp showed about 71 per cent. moisture, 14 per cent. sugar and over 5½ per cent. albuminous substances and hydro-cellulose. This indicates a food of greater nutritive value than is found in our other table fruits. The persimmon pulp resembles the date somewhat, and was dried with difficulty. The seeds are very hard and flinty, so that the work of preparation for analysis was more difficult than with other American fruits.

The average number of seeds in one fruit varied from 1.74 to 5.07, these figures being the averages from many fruits used. The per cent. of pulp ranged from 82 to 88½.

Persimmons may be budded or grafted in the spring. The seed does not produce true from its kind, hence it is necessary to bud or graft. As a rule, in southern Indiana the trees grow on hilly clay soils, in neglected and worn-out land. It will grow, however, on the lower, richer soils.

Through the process of selection and hybridization, eventually, without doubt, the persimmon will be developed to a degree that will place it among the more desirable of the fruits native to North America. These more improved varieties will be free from astringency of skin, more or less seedless, and, besides having a rich, sweet flesh, will possess good shipping qualities.

Attention is now being directed toward this fruit. Nurserymen are handling the trees, and many letters have been received at this station from both at home and abroad, asking for more information concerning it. The further development of this fruit offers an attractive field for the horticulturists of the lower Mississippi valley.

Purdue University, Lafayette, Ind.

C. S. Plumb.

Foreign Correspondence.

Cambridge Botanic Gardens.

THE Botanic Gardens attached to Cambridge University are second only to Kew among the public gardens of England, if judged by the extent and interest of the collections of plants they contain. Although only some seventeen acres in area, they are so cleverly laid out as to appear to be at least twice that size. The houses and frames cover an area of 13,850 square feet, and as they are mostly modern in structure they afford accommodation for a large and varied collection of tender plants of all kinds. The houses are all new, having been built in 1888-91 at a cost of £6,000. They consist of a handsome corridor 270 feet long, sixteen feet high and ten feet wide. On the south side of this corridor there are eight handsome houses, and on the north side are the sheds, laboratories, propagating-houses, garden library, stokehole, etc. These all communicate with each other through the corridor, an arrangement of the greatest convenience, both for students and gardeners.

The history of the Cambridge Botanic Gardens is not without interest. It was first proposed to form a "physic garden" as an adjunct to the University in 1696, when the ground was selected and plans made, but no further steps were taken until 1761, when about five acres of ground on the site of the monastery of the Austin Friars was secured at a cost of £1,600. Philip Miller, the curator of the Chelsea Botanic Gardens, the Kew of that period, was

consulted with regard to the plans, and a relative of his, Charles Miller, was appointed first curator, Thomas Martyn, the editor of an edition of *Miller's Dictionary of Plants*, being then Professor of Botany. Other curators of these gardens were J. Clarke, P. Salton, J. Don (author of *Hortus Cantabrigiensis*), A. Biggs Murray, Mudd, and the present curator, R. J. Lynch, A. L. S., who has held that post since 1879, after having served about twelve years at Kew. The Professors of Botany have been R. Bradley, J. Martyn, T. Martyn, J. S. Henslow, C. C. Babington and Marshall Ward, the present professor, who has only recently been appointed. In 1847, the then gardens were too small and ill-suited for the work they had to do, and a piece of land on the south side of the town, about thirty acres in extent, was secured at a cost of £2,200, to which the collections were transferred. Thirteen acres of this is let as allotments, so that it can be added to the Botanic Garden as required. The gardens were remodeled by Murray, the curator in 1847, who performed the work most creditably.

The main object of the gardens is for the scientific service of the University. This means the cultivation of collections of all kinds of plants representative of the world's flora, grouped for convenience of study and available for use in the dissecting-room and laboratory. In addition to this, large quantities of seedlings, flowers and fruits have to be supplied daily during term time for classroom and other purposes. This entails considerable labor for the garden staff, as on some days a thousand or more specimens have to be prepared for the botany classes. Material for original research by the professor and other botanists attached to the University has also to be kept in readiness. The ordinary show botanic garden knows nothing, or very little, of the latter duties. Although these gardens are the sole property of the University, the public are admitted every week-day, subject to certain regulations.

That the public avail themselves of this privilege is seen in the fact that between two and three thousand visitors enter the gardens on Bank holidays. The gardens are managed by a syndicate composed of the Vice-Chancellor, various head-masters of colleges, the Professor of Botany and several others, but the practical management is vested in the curator in consultation with the Professor of Botany.

During a recent visit to the gardens I noted the following interesting plants flourishing there: Stove-plants—*Erythrina Sandersoni*, a thick-stemmed, large-leaved species similar to one I have seen under the name of *E. Natalensis*; *Kendrickia Walkeri*, a new and beautiful climbing *Melastomad*, recently introduced from Ceylon, but not yet flowered in Europe; *Utricularia longifolia* and *U. Endresii*; *Heliampora nutans*, the Roraima Side-saddle plant, *Medinilla Curtisii*, *Jasminum lineare*, *Bauhinia Galpini*, in flower; *Saintpaulia ionantha*, used as an edging on gravel-covered stages, for which it is perfectly adapted; *Aloe plicatilis*, an enormous specimen, a century or more old, and probably the most noteworthy example in Europe. Greenhouse plants: *Cobæa macrostemma*, an old garden plant long lost to cultivation, but recently reintroduced. It has greenish yellow flowers, and while it is quite distinct from the familiar *C. scandens*, it serves the same purpose as a quick-growing screen or curtain-plant; *Polygonum equisetiforme*, so very like a Mare's-tail that even botanists have been deceived by it; *Mentzelia bartonioides*, a beautiful annual as grown here in pots for the conservatory, the seeds being sown in February, and the seedlings pricked six in a four-inch pot, the whole being again shifted into eight-inch pots and kept in a cool house. Thus treated they form a compact, bushy specimen a foot or so in diameter, and produce their large, bright yellow flowers in profusion until winter. *Grammatocarpus volubilis* is grown in the same way. *Begonia gracilis* (Martiana) is grown exceptionally well here both inside and out, a bed of it in a sheltered position on a lawn being a beautiful picture even in October. Ferns and their allies are strongly represented and exceedingly well grown, from Tree Ferns to Mosses and Hepaticæ, the latter being a special feature.

Outside, there are many rare plants happily provided for: the hardy Cacti are well represented; *Gerbera Jamesoni* has leaves as large as Docks and flower-scapes two feet high, bearing large, rich orange-colored flowers; *Anomatheca grandiflora*, *Crinum crassifolium*, *Capparis spinosa*, *Anthericum Bowkeri* and other reputed tender plants are here in robust health in sheltered corners outside. Hardy Bamboos are well represented; indeed, Mr. Lynch was the first to show how effective these plants are when planted in groups in the neighborhood of water. *Parrotia Jacquemontii* is doing well in a sheltered position. Hardy Fuchsias are specially cared for; a large collection of Willows, another of Rubus (Brambles) and another of Roses are noteworthy. All kinds of moisture-loving or bog-plants are grouped about the margins of the lake or cozily set in a bog-garden, surrounded by sloping banks upon which rare Ferns, Primroses and select herbaceous plants are at home. An enormous group of Tree Ivy, sprawling over the lawn, is a picture at all times of the year, and the vigorous growth of the Indian Dodder, *Cuscuta reflexa*, upon its stems gives it a special interest for botanists. *Ephedra distachya* is here a magnificent specimen twelve feet through. On one of the walls a plant of *Thladiantha dubia* had grown very freely, and for the last three months of the year it bears hundreds of ovate fruits three inches long and colored scarlet to crimson. This plant is worth growing for its decorative fruits.

London.

W. Watson.

Entomological.

Another Plum Scale.

PROFESSOR A. B. CORDLEY, of the Oregon Experiment Station, has just sent me specimens of a Lecanium scale numerous infesting a twig of Plum. When I opened the box and saw a Lecanium, I thought at once that the New York Plum scale must have reached Oregon; but a second glance showed that I had before me an insect not before found in the United States. This is, I think, without any question, the European *Lecanium bituberculatum*, named originally by Targioni-Tozzetti in manuscript, and described by Signoret in 1873. The species is a very peculiar one, and I cannot find that the Oregon examples differ in anything from the European type. The scale in size and shape is like the New York scale, but there are two prominent nipple-like tubercles on the back; and sometimes two others, less prominent, in front of them. From each of the larger tubercles to the edge of the scale runs a keel. All this can be seen with a lens of low power, or, indeed, with the naked eye. A microscopical character is found in the tibio-tarsal articulation of the legs, which is thickened. The scales are often more or less marked with white; such examples Targioni-Tozzetti proposed to name *pictum*.

Curiously, this scale is not recognized as a Plum scale in Europe, but is found upon Hawthorn, *Crataegus oxyacantha*. It is not, surprising, however, that a Hawthorn scale should attack the Plum. It is widely distributed in western Europe. Signoret reports it as occurring in quantity at Florence, Cannes and Hyères. Mr. Sulc has found it in Bohemia. Mr. Douglas records it from Exeter and Lee, in England, and Mr. Newstead had it from Heacham, Norfolk.

Mr. Cordley's specimens are labeled "No. 18. C. L. Dailey. Salem, Oregon, 1-28-96." Just how troublesome this scale is going to be with us it is too early to predict, but if it becomes abundant it may very likely rival the New York insect.

Mesilla, N. M.

T. D. A. Cockerell.

When the forest floor is covered with brown November leaves, how cheerful is the unwithering Polypody, clothing the rocks with perennial verdure, defying frost and full of life. How strangely interesting the form of its small plumes, fit to be a tuft about the base of a column. Why should not its form be copied by our sculptors instead of the foreign *Acanthus* leaves and berries?—*Thoreau*.

New or Little-known Plants.

Aspidium cristatum × *marginale*, Davenport.

THIS Fern, which was first published and described by me* as a hybrid between *Aspidium cristatum* and *A. marginale*, is now figured for the first time from drawings made by Mr. Charles E. Faxon, and I avail myself of the opportunity to give a brief résumé of its history, and to emphasize more strongly than heretofore the essential characters by which it may always be distinguished from its congeners.

Originally discovered by Mr. Raynal Dodge, of Newburyport, Massachusetts, and sent by him to Professor Eaton, who placed it in my hands for elucidation, this Fern received a most thorough and careful investigation extending through a period of nearly two years before publication. Since its publication I have made frequent and careful observations on the plants growing on my own grounds, side by side, with *Aspidium cristatum* and *A. marginale*, with the result that I reaffirm more strongly than ever its right to recognition. Whether considered as a hybrid or an independent species, the evidence here adduced must establish beyond any reasonable question its right to a permanent place among our Ferns, while the fact of its having been found in six or seven different stations, wide apart, shows that it is not a mere transitory freak, but a form that is likely to be found in many more stations, if not, indeed, almost everywhere where its probable parents grow together, or near by, under favorable conditions.

Mr. Faxon's drawing (see page 445) was made from specimens recently taken from a plant growing on my grounds, but which originally came from Boxford, Massachusetts, in 1893, and the frond drawn was selected as being typical in character. A comparison of this frond with corresponding fronds of *Aspidium cristatum* and *A. marginale* shows that this one combines characters belonging to the other two, the upper portion being similar to *A. marginale* in breadth and the long, acuminate lanceolate pinnæ and the lower portion, about one-third of the whole, resembling *A. cristatum* in the shorter, broader and obtuse pinnæ. The texture and venation is nearly that of *A. cristatum*.

The position of the sori in this Fern varies a little, being sometimes nearly, or submarginal, or nearly medial, but usually a little nearer to the margins than in *Aspidium cristatum*, while the indusia are generally, before ripening off, convex, as in *A. marginale*. The bases of the stalks in this Fern are more densely clothed than in *A. cristatum*, and with similar pale brown scales of two kinds—the lower long linear, the upper ovate—as in *A. marginale*. But the strongest argument for this Fern's position lies in the structure of the root-stock, that of *A. cristatum* lying horizontal, with a lateral development of the crown, while in *A. marginale* and in this Fern the root-stock is a true caudex, growing erect with a central development of the crown, as shown in Mr. Faxon's figures of the root-stock of *A. cristatum*, from a plant growing in the open, where it had every opportunity to grow erect if so disposed, and the root-stock of this Fern, the caudex being halved to show the erect growth of the stipites which surround the growing end in a circle, exactly as in *A. marginale*.

To sum up the result of my three years' observations on these three Ferns, I can come to no other conclusion than to consider the present Fern as a hybrid between the other two, and as it may be looked for with every probability of finding it under conditions similar to those under which it has already been found, I append comparative descriptions, giving the most essential characters and the stations from which it has already been recorded:

- (A) *Aspidium cristatum*: Root-stock recumbent, crown lateral, crossiers thinly clothed with darkish brown scales. Fig. 36 (5). Fronds (fertile) linear-lanceolate, narrowing below; pinnæ obtuse, or slightly acute. Fig. 36 (4). Sori medial, indusia flat.

* *Botanical Gazette*, vol. xix., p. 494, December, 1894.



Fig. 58.—*Aspidium cristatum* x *marginale*, Davenport.—See page 444.

1. *Aspidium cristatum* x *marginale*; two-thirds natural size. 2. Pinnule of same, enlarged. 3. Pinna of *A. marginale*; two-thirds natural size.
4. Pinna of *A. cristatum*; two-thirds natural size. 5. Root-stock of *A. cristatum*; two-thirds natural size.

(B) *Aspidium cristatum* x *marginale*: Root-stock erect, or suberect; crown central, crosiers densely clothed with pale brown scales. Fig. 36 (1). Fronds (both fertile and

sterile), upper two-thirds like *marginale*; lower one-third, as in *cristatum*, the upper pinnæ long, acuminate. Fig. 36 (1). Sori submarginal or medial. Indusia convex.

(C) *Aspidium marginale*: Root-stock as in *B*. Fronds broad, lanceolate, with acuminate pinnæ. Fig. 36 (3). Sori marginal; indusia convex.

The fibro-vascular bundles do not seem to furnish reliable characters, the number being dependent on the stoutness of the stipe, but those of *Aspidium cristatum* and this Fern appear to correspond in showing 5, somewhat obscurely, at the very base of the stipe, and these soon decrease upward to 3, the latter number prevailing at the lamina, while *A. marginale* shows 5, and in large fronds 7, distinctly at the base, retaining 5 upward to and beyond the lamina; and this last is true also of *A. Clintonianum*.*

I have elsewhere (*Botanical Gazette*, l. c.) alluded to the remarkable disposition on the part of this Fern to produce abortive fronds, and this character—strongly corroborative of a hybrid origin—has been especially noticeable on my living plants during the seasons of 1895 and 1896.

The following are the present stations for this Fern:

Boxford, Newbury and Merrimac, Essex County, Massachusetts, 1892, also Warren, Rhode Island, August, 1894, Raynal Dodge.

Medford, Massachusetts, October, 1894, G. E. D.

Dover, Maine, 1895, Merritt Lynden Fernald.

Pittsford, Vermont, 1896, Miss Margaret Slosson.

Medford, Mass.

George E. Davenport.

Cultural Department.

The Origin of Garden Gladioli.

THE praise given to *Gladiolus Nanceianus* by your London correspondent in *GARDEN AND FOREST* for 7th October, is well deserved, and I think it may interest your readers to hear something more, about the origin of this and other remarkable garden races of this noble genus.

The Gladioli of gardens may be distinguished in an early-flowering and an autumn-flowering group. The large group of early Gladioli embraces innumerable forms of species and hybrids, where, among the most common types, are the Cape species *Gladiolus blandus*, *G. cardinalis* and *G. tristis*, and the hybrids *G. ramosus* (*Cardinalis* × *oppositiflorus*), *G. Colvillei* (*tristis* × *cardinalis*), etc. I cannot treat this section in detail now, and will only say that one of the most useful new additions to it is the soft rosy pink *Cardinalis* variety, *Queen Wilhelmina*, which has been highly spoken of in various gardening papers.

The late-flowering Gladioli have so improved of late that the original species have become very insignificant, compared with the garden hybrids of their progeny. Five distinct races of autumn-flowering hybrid Gladioli have been sent out up to the present, an abbreviated description of which may follow here:

1. *GLADIOLUS HYBR. GANDAVENSIS*.—This section is well known, although there is still some doubt as to its exact origin. The first announcement of the original hybrid appeared in Van Houtte's Catalogue, No. 6, which was published on August 31st, 1841. There are two opinions as regards the origin of this hybrid. In the *Flore des Serres*, published by Van Houtte himself, it is stated to be the result of a cross between *G. cardinalis* and *G. psittacinus*. On the other hand, we have Dean Herbert's opinion, who found that the indicated cross, "if not absolutely impossible, is so difficult that repeated attempts made during successive years (by himself and others) have all proved abortive." On the contrary, the Natal species, *G. psittacinus* and the Caffrarian *G. oppositiflorus*, have been freely crossed by Herbert and several others, and the result was exactly the same *Gladiolus* figured in the *Flore des Serres* as *Gandavensis*. The hybrid created a sensation, but was, of course, soon surpassed. The most successful raiser of new varieties was Monsieur Souchet, of Fontainebleau, and after his death, in 1872, his successors, Messrs. Souillard and Brunelet.

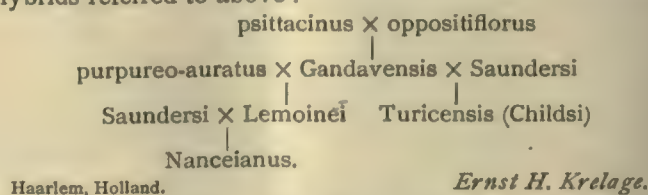
2. *GLADIOLUS HYBR. LEMOINEI*.—Some twenty-five years ago a new species of *Gladiolus* was introduced from the Cape, which proved to be hardy, or, at least, more hardy than the *Gandavensis* varieties. It was crossed by the skillful hybridizer, Monsieur Lemoine, with the best *Gandavensis* varieties, and so he obtained the first hybrids of a new race which he called *Lemoinei*, and which made its appearance at the Paris International Exhibition of 1878. Being pretty well known at present, it does not need description. Every year the colors of the new varieties become more brilliant and effective. It is a pity, however, that the more beautiful the varieties become the more they lose their hardy qualities, a natural consequence of the little purpureo-auratus blood remaining in the progeny.

3. *GLADIOLUS HYBR. TURICENSIS AND CHILDSI*.—Both of these sections originated in the same manner—namely, by crossing *Gladiolus Saundersi*, another Cape species, introduced some twenty years ago, with *Gandavensis* varieties. *G. Turicensis* originated in Mr. Froebel's nursery at Zurich. It is probably lost to cultivation now. The history of *G. Childsi* is rather confused. Many years ago Herr Max Leichtlin made a similar cross as Mr. Froebel, and sold the hybrids obtained to a French nurseryman, from whom they were purchased by an American firm, the stock of which went afterward to Mr. Childs, of Floral Park, who gave them his name and pushed them successfully.

4. *GLADIOLUS HYBR. NANCEIANUS*.—This race, referred to by Mr. Watson on page 403, is of quite different origin from *Gladiolus Childsi*, and the two races must not be confounded. *G. Nanceianus* was the first hybrid of a series now comprising some fifty varieties, raised by Monsieur Lemoine, and first presented to the horticultural public at the Paris Exhibition of 1889. It originated from a cross between *G. Saundersi* and *Lemoinei* varieties, and this origin at once shows that the *Nanceianus* race is an advance on *Turicensis* and *Childsi*, as one of the parents, namely, *Lemoinei* hybrid, was an advance on one of the parents in the other case (*Gandavensis* hybrids). A few varieties of the *Nanceianus* race are not so vigorous as could be desired, but the newer ones especially are strong growers, throwing up spikes six feet tall, carrying large-sized flowers, often measuring more than seven inches across between the tips of the two lateral segments of the corolla, which are developed in the form of two large triangular, fully expanded wings, and the colors are simply marvelous. All the trade varieties hitherto introduced were obtained by Monsieur Lemoine, and we have not seen any hybrids from other origins surpassing them.

5. *GLADIOLUS HYBR. MASSILIENSIS*.—Although this is one of the newest races offered, it is in no way an advance, which is not surprising when we remember that one of the parents is the very old and ugly *Gladiolus psittacinus*, which has been improved by hybridizing for fifty years already. We only refer to it here for completeness.

Concluding, I beg to give a little pedigree showing the affinity and origin of the principal races of *Gladiolus* hybrids referred to above:



Hybridizing Orchids.

RAISING Orchids from seed is most interesting work, but it is also work that requires for the best success patience and skill and all the conveniences and appliances known to the most advanced horticultural practice. In a late number of the *Orchid Review*, Mr. H. A. Burberry gives some excellent advice on this matter which it is worth while to reproduce here:

If you have already as much work as you can possibly get

* Mr. C. E. Waters published in the *Johns Hopkins University Circular*, No. 119, June, 1895, a very useful paper on the fibro-vascular bundles in the stipe as an aid to the determination of doubtful specimens, under the title of "An Analytical Key for our Local Ferns Based on the Stipes."

through, and have no more time to spare; if you have not houses built on the most modern principles; if you are lacking patience, then don't attempt raising Orchids from seed on your own account, and you will probably save yourself from much disappointment. If you are fortunate enough to have these necessities at your command, and feel disposed to try, then, in order to further prevent disappointments, do not be oversanguine about results. Never set a flower if the plant is not in first-rate condition and quite able to bear the stress of producing the big seed-pod, which will take the best part of a year to mature, for it kills weakly plants. Never cross inferior varieties, because the progeny, if reared, would probably be worthless, and cross only those varieties from which, for some reason or another, something good might be expected. Be very careful in labeling the flower directly it is crossed, and remove its own pollen clean away, so that there may be no mistake in the parentage.

When the seed is ripe the pod will split. Now sow the seed immediately on the surface of the compost, selecting plants which have lately been repotted—recently imported plants that are making plenty of roots, in preference to others—but make sure that any plant on which seed is sown will require to be kept moist for at least two or three months afterward. The seed germinates more surely on plants that are suspended near the light. Be careful that the seed is not washed away by the first few waterings the plant receives; afterward there is less danger. If the seed is good it will soon commence to germinate and become round-shaped, about the size of the head of a pin. This is a critical point, for if the compost is not just right those green globules will speedily disappear. Therefore, if the surface of the compost appears not to be in a good sound condition, commencing, as it often does, to become sour and decomposed, it is better at this stage to transfer the seed at once to sweet material in tiny seed pots, placing five or six in each pot, a number of which should be placed in teak baskets and suspended in a shady part of the house and kept continually moist. The cause of the surface of the compost becoming prematurely decayed is often insects living within the pot. In some gardens the compost becomes literally alive with a small species of fly, and these quickly destroy Orchid seed. When once these tiny globular plants become established in their new pots they quickly form a little leaf, and a little root grasps the compost. After this the rest is comparatively easy. They will soon require to be potted off singly in the seedling pots, and then grown on. Do not overpot, and see that fresh sweet compost is supplied whenever necessary.

There is yet a large field open to hybridists. Even supposing quite new crosses cannot at all times be made, there is still no reason why crosses already in existence, if good, should not again be reared. By doing so better varieties may be obtained, and, more than that, advanced as we are in Orchid culture, we have still much more to learn before we can say to ourselves, "These plants we possess, and we are absolutely sure of retaining them," for, like other garden plants, Orchids will sometimes die.

Orchid Notes.—II.

AT this season, also, it is best to repot the *Miltonias* of the type represented by *M. vexillaria*. The growths will be well started by this time, and new roots will begin to start from the base. There is an upward tendency to each successive year's growth, and it is necessary to set the plants lower down in the pots, even though the oldest bulbs may be buried, so as to bring the new growth and roots just below the level of the potting material. The roots rarely go very deep in the pots, but rather penetrate near the surface and on the outsides of the pots. They should not be repotted into pots larger than is absolutely required for the current season's growth. One application of water when not required will often cause deep-seated decay that is hard to arrest. It is better not to use loam in the compost, as some cultivators recommend; in other words, make the potting material as porous as possible, so that the large quantities of water needed in the growing period may be applied without danger. With an occasional application of stimulant in a liquid form this lovely Orchid may be cultivated with ease, and improved year after year. Our plants have been taken from the cool house where they have spent the summer, and after repotting have been placed at the cool end of the Cattleya-house, where the temperature will range about fifty-five degrees during the cold weather. A layer of fresh tobacco-stems has been placed under the trellis on which the pots stand to guard against thrips, which, if once they gain a footing, speedily ruin the foliage and blight the

flower-stems. Our experience with *Miltonia vexillaria* has shown that it is safer to keep the specimens rather small than to grow them on into pots larger than six-inch. They are easily divided at potting time, and are much more useful for decoration if grown in moderately small pots. Hybrids from *Miltonias* are not common, but are represented by one or two notable examples. We have just succeeded in getting a fine seed-capsule on *M. vexillaria* crossed with *M. Clowesii*, and hope that good fertile seed may be produced in due season.

Odontoglossum Rossi is one of the prettiest Mexican species, and is very useful for boutonnières in winter. It is easy to cultivate if attention is given at the right time. The growth is maturing now, and a light position in a moderately warm house is needed. The plants have summered in the coolest house, and are taken into more light at this time. If left in the cool house for the winter they would soon dwindle away. *O. citrosimum* is another Mexican plant that will soon finish growing, and when the bulbs are well matured it is best to suspend the plants near the glass in a light position, giving very little water during the resting season. But we have never found it necessary to let the bulbs shrivel to any degree to induce the plants to flower. We give water sparingly until the spikes appear at the tips of the young growths. Sometimes this is not until midsummer, but rarely does a plant miss blooming. The spikes are strong, often branched, whereas they would be weak if the bulbs were not plump, to aid them at flowering time. There are few Orchids that have such a charm when in bloom as well-flowered plants of *O. citrosimum*, with the long pendent flower-stems, often a yard long, and the delicious lemon fragrance in early morning. If the plants are not disturbed very often there is no trouble in growing them. We use nothing but Fern-fibre for them and rarely disturb them oftener than once in three years.

Dendrobiums of the Nobile section will now have mostly completed their growth; they need a cooler temperature, or another start will be made, though there is not so much tendency this sunless season as in some other years. Should a start be made we ignore the fact and rest the plants just the same, or the whole machinery of the plant would be thrown out of gear if we attempt to make up a satisfactory growth at this period in a higher temperature. It is best to avoid too much sun at first when putting the plants to rest. I like to see the leaves a healthy green, also the pseudo-bulbs. The bright yellow they assume with exposure is not so well to start from again after the plants are weakened by flowering. The moss in which the plants have grown may be allowed to become quite dry before water is applied, just enough being given to avoid shrinking of the stems.

During the past few weeks very little water has been used to damp the house in which the plants are growing, but as soon as more fire-heat is applied more water must be sprinkled to counteract the parching effect on the atmosphere; and also now on bright days, if there should be any, for we have had but two sunshiny days in three weeks. Most of the plants are now going to rest, nearly all the *Cattleyas* being in this stage. Less water will be needed to assist in the maturing that leads to abundant flowering. When water is given at the roots we find it well to turn on a little heat under the benches where the largest pots stand, to dry up the superabundance of water that is not desirable at this season. The benches are made of open trellis-work that allows a free circulation of air. If fresh Oak-leaves can be procured, a good supply will be sprinkled with slaked lime and then placed on the ground under the benches. The lime hastens decomposition, kills insects, and the leaves give off a steady supply of food for the roots that are eager to take it up if it is made more available by frequent spraying when fire-heat is much used, as in midwinter.

South Lancaster, Mass.

E. O. Orpet.

Perennial Phloxes.

THESE are among the best and the most popular of hardy herbaceous plants, being adapted to all places and of the easiest culture. They grow luxuriantly in any good garden soil, and are suitable for the mixed border, single specimens for planting in beds or masses, and they flower from early in August until late in autumn. Great improvement has been made in these plants during recent years, German and French growers having produced some magnificent varieties which, for brilliancy of coloring, size of individual flowers and of the panicles, are marvels of garden skill. The following list embraces some of the most worthy, and includes a number of very distinct colors, from pure white to rich crimson:

Ascanio, dark rosy salmon, white centre, large flower; B. Comte, dark amaranth-purple, the richest, largest and best dark variety; Captain Wilheheny, fiery red, shaded maroon,

extra fine; Consul H. Prost, dark carmine, with violet centre; Duguestin, a distinct shade of violet, with light border; E. Schmidt, pure white, large carmine centre, of the finest size and very desirable; Esclamonde, rosy lilac, shaded white, with purple centre; E. Levavasseur, creamy white, large panicles; Garteninspector Elpel, dark rose, with blood-red eye, a superb variety; Jourdan, rosy violet, large white halo, a choice flower; H. O. Wijers, white, with blood-red eye; Kossuth, rosy-tinted salmon, large panicles; M. Kind, large flower, salmon-red, shaded vermilion; Madame E. Love, fine white, dwarf, one of the best; Orientale, lilac-rose, with white eye, quite distinct; Obergartener Wittig, dark rose, marbled white, with carmine eye; Pantheon, large, tender, rose, very choice; Peter Henderson, light purple-violet, large flower, distinct; Pierre Loti, dark rosy carmine, large panicles; Simplon, carmine-salmon, centre purple; William Robinson, rosy salmon, large violet centre, one of the best.

Riverton, N. J.

William Tricker.

A Dwarf Stock for the Peach.

THE chief hope for Peach growing in climates where the flower-buds are habitually killed in winter, lies in securing a stock that will dwarf the tree sufficiently to render winter protection practicable. For some years past I have been endeavoring to find such a stock. My first hope lay in the dwarf Flowering Almond, *Prunus Japonica* (?), but with this I failed to secure a union with buds of the Peach. I would not say that the Peach cannot be successfully budded on this stock, but repeated efforts here in Wisconsin resulted in failure. I inserted a total of several hundred buds in four different trees without securing a union in a single instance. Budding in our dry and warm summer weather is much more difficult than in the eastern states, and it is possible that the Peach may be budded on the Flowering Almond in a climate more favorable for budding.

I next tried a form of the Sand Cherry, grown from pits procured in western Iowa. This shrub is quite dwarf, attaining a height of only two or three feet. Professor Bailey pronounces it *Prunus Besseyi*, the same species to which the so-called Improved Dwarf Rocky Mountain Cherry belongs. With this stock I have been more successful. I inserted a few buds in it in 1893, and while I had less expectation of success than with the Flowering Almond, I succeeded much better. The Peach grew vigorously on this stock, and by the second year had attained the height of about five feet. The past season, although the best growing season we have had for some years, the Peach-trees on this stock have scarcely increased in height. They have branched rather thickly, and at present are well filled with flower-buds, from which I infer that they will probably not grow larger than they now are. At this height the trees are readily protected by digging away sufficient earth from the roots, so that the trunk may be bent down readily, when the whole is covered with earth. The trees blossomed the past spring and set some fruit, though the fruit failed to mature.

I am also trying *Prunus subcordata* and a dwarf form of *P. maritima*, but with what success remains to be seen.

Experiment Station, Madison, Wis.

E. S. Goff.

Correspondence.

Lilium Washingtonianum.

To the Editor of GARDEN AND FOREST:

Sir,—This is a Lily of the high mountains of California and Oregon. In California it is found only in the Sierra Nevada from San Bernardino County north to Mount Shasta, while in Oregon and Washington it is confined to the Cascades, the lofty northern continuation of the Sierra Nevada range. In all cases its home is to be found in the higher, cooler regions, the upper Pine forests, or in the thickets of Wild Cherry, *Manzanita* and *Ceanothus*, still higher up, regions where the snow-fall is great and melts slowly, and a long period of root-growth is insured. In such places its strong stalk is pushed up quickly as the melting snow gives it the opportunity, and rising to a height of five to seven feet in June, July or August, according to climate, its grand white flowers are unfolded, perfuming the air for miles around. I once saw 10,000 on a single great mountain slope in brush, a count that I can better vouch for as I transferred the bulbs to sacks at a later period.

Lilium Washingtonianum proper has three variations of importance: The type is white-flowered, with purple dots, and has a very large horizontal bulb. Bulbs of this often measure

ten to eighteen inches around, and weigh from ten ounces to two pounds.

About Mount Shasta there is a variety with flowers and stalk like the type, but with little bulbs, seldom over two ounces in weight, and averaging less than an ounce for flowering bulbs.

Plants of *Lilium Washingtonianum* in Oregon and Washington have, according to my observation, broader, more ovate, leaves; I find, too, that many of the scales on them are jointed; those in the Sierra Nevada seldom are. Some scales are two or three jointed, and the joints easily separable.

About Mount Hood, in Oregon, the variety *Purpureum* is found. This is quite a different Lily from the *Lilium rubescens* of the northern Californian Coast Range, with which it is often confounded. In bulb and stalk it is like the type. The flowers either open a light purple or a white, spotted and suffused with purple, and quickly becoming a deep purple throughout.

In addition to these varieties, an occasional yellow-flowered sport is found in the California Sierras.

One of the most striking instances of the adaptation of plants to changed surroundings came to my notice recently. I received a consignment of *Lilium Washingtonianum* bulbs from a collector in the main Willamette Valley, in Oregon. This is the largest valley of Oregon, a broad plain many miles wide. The size of the bulbs and the large number of double or triple bulbs attracted my attention. Some of the bulbs were immense, and as many as five large bulbs were together. A letter of inquiry brought the following answer:

"I would say that all that grow here in the valley grow in cultivated fields; they do not seem to thrive in pastures, or even along the fence-rows. Every bulb that I have dug has been dug in a field. Their native home is far up among the mountains, in loose, untrodden soil. Fifteen years ago I knew of their growing in only one field in the upper Willamette Valley. They were much noted and admired. From that field they have spread over the surrounding valley in spots. They cannot be said to be very plentiful yet, but the situation seems to suit them perfectly. They usually grow in clumps and some are always injured by the plow."

I may add to my correspondent's interesting remarks that the soil is gravelly, or somewhat sandy. Of course, the cause of the double bulbs is the injuries from the plow, causing the bulbs to "break up." Evidently, the Lilies flower and seed in grain-fields before the grain is cut, and if so there is no limit to their spread, as under prevailing agricultural methods they would soon be below the plow limit. In California and Oregon it is customary to sow grain one season and to merely seed and harrow the second year, thus giving the Lily seedlings two years in which to get below the shallow plowing in vogue. The mature bulbs grow from six to twelve inches down and are perfectly safe. The bulbs will be in very firm, packed soil. The whole incident is suggestive to cultivators. *Lilium Washingtonianum* has always been regarded as a difficult subject to grow, but if it will thrive under such conditions as my correspondent has outlined the grower need not despair. I may add that out of six hundred bulbs from gravelly soil 169 were from ten to sixteen inches in circumference and averaging twelve ounces in weight, while 331 were from seven to ten inches in circumference and averaged six ounces in weight.

Ukiah, Calif.

Carl Purdy.

A Good Variety of the Jerusalem Artichoke.

To the Editor of GARDEN AND FOREST:

Sir,—For several years I have grown an improved Artichoke with the best results, and I consider it the best of all roots for hogs. My plan is to feed all the artichokes the swine can eat until just before killing, when a few bushels of corn are given to harden the meat. This plan saves many bushels of corn. One acre will keep from twenty to thirty hogs from September until June in healthy and generally good condition. For cattle, horses and sheep there is not a better root grown. One acre will yield from three hundred to seven hundred bushels of tubers, depending, of course, on the fertility of the soil, although immense quantities are produced in any soil. Low land which is too frosty for Corn is entirely suitable, as freezing does not injure them. Drought seems to have but little effect on the plants.

The Improved White Artichoke originated in Europe, where it is largely grown for domestic use as well as for stock. It is entirely distinct from the native or wild variety commonly cultivated. It grows about six feet high, and is covered in autumn with its yellow flowers, which in this country never mature seed. There is thus no danger of the roots covering the farm.

Many farmers are afraid to plant Artichokes because they think they cannot be eradicated. My experience of five years proves that they can be destroyed by plowing under when the plants are one foot high. At this time the old tuber has decayed in giving life to the new top, and no small tubers are yet formed. A more simple way is to put the hogs in the patch somewhat late in the spring, and they will find every one. The tubers are much more round than the common kind and have no deep eyes; the flesh is pure white, very brittle and sweet. Many farmers in Newaygo County are growing Artichokes extensively as a general farm crop. No insect, blight or rust has yet attacked them, and the tops make a fodder superior to Corn when properly handled. Last winter they were tested at the creamery at Fremont with the best results. For table use they are richer and preferable to the type in every way.

Fremont, Mich.

J. H. Van Ness.

October in Kentucky.

To the Editor of GARDEN AND FOREST:

Sir,—The foliage effects in the Blue Grass region of Kentucky and along the Kentucky and Ohio rivers this year are marvelously beautiful. The indigenous Ash, Beech and Hard Maple trees at historic Ashland, the home of Henry Clay, stand in golden grandeur among the picturesque Pines that were transplanted there in the times when no nurseries existed west of the Alleghanies and there were no means of shipping nursery stock to the then western wilds. In those days these seedling Pines were brought down from the highland forests of Kentucky by hardy mountaineers and sold from door to door in Lexington, as village people are now sometimes supplied with pot plants from a florist's wagon. At Ashland these trees are seen against a background of rolling land, smooth and free from undergrowth and carpeted with the famous Blue Grass sward of Kentucky. All this combines to make a characteristic scene quite unlike any to be found elsewhere, and most impressive by its simplicity and perfection. Some immense Catalpas are among the Ashland trees, with several handsome old American Hollies. The bulk of the indigenous growth is made up of Ash, Sugar Maple and Beech, but in a retired corner of the farm a group of Sour Gums flame like a bonfire.

The high bluffs of the Kentucky River, near Frankfort, were fairly dazzling, as seen from the train or the well-kept pikes that in places traverse mere shelves cut out of the face of the rocky bluffs, with only a frail board fence between the roadway and a sharp incline down to the waters of the river. Besides the prevailing Ash and Maple there were Dogwoods by the thousand, standing singly and in groups, making splashes of crimson. Sweet Gums, Liquidambar, their sharply cut leaves setting them apart from other species even at quite a distance, were here as bright in tone as the Dogwoods, and these took on that rich purplish crimson tone peculiar to themselves. Indescribably vivid were the hues of the Sour Gums, or Tupelo, while here and there among the foliage that sweeps up the steep and lofty river hills magnificent Scarlet Oaks stood like exclamation points in the landscape. A foil to this varied splendor was furnished by a background of the living green of the Red Cedar, and behind all this the broken, but symmetrically layered, limestone through which the river here cuts its bewildering way. To stand at the grave of Daniel Boone, on the top of an abrupt bluff, some 250 feet above the water, and note the landscape up and down the stream is to realize that small rivers have a picturesque beauty that no larger waterway can rival.

The autumn weather, scenery and roads of this part of Kentucky offer a field for bicycle excursions that would seem unrivaled, especially when the historic interest of the state is considered and the cordial hospitality of her inhabitants is borne in mind.

Brighton, Ill.

Fanny Copley Seavey.

Autumn Color of the Liquidambar.

To the Editor of GARDEN AND FOREST:

Sir,—Among the deciduous trees whose leaves turn to bright colors in autumn the Sweet Gum, Liquidambar styraciflua, stands decidedly in the front rank in this locality. The rich crimson coloring, combined with their beautiful form and glossy appearance, together with the length of time they remain on the trees, makes this one of the best for planting where autumn effects are desired. Among shrubs, the red and orange shades of Berberis Thunbergi and Spiræa pruni-

folia are most conspicuous, while the Privets are the last of all to shed their leaves, and they remain green and fresh-looking long after other shrubs have become bare. In the hardy-plant border the most attractive-colored leaves were to be found among the low-growing Polygonums. P. repens is the best we have; the bright red leaves make it a most conspicuous object in the fall. P. Chinensis and its varieties, Thunbergianum and scabrum, are well worth growing for the sake of their autumn colors.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Recent Publications.

ON page 200 of the current volume it was stated that Professor John B. Smith, of the New Jersey Experiment Station, was about to make a journey to California to study the character of the lady-bird beetles, which feed upon scale insects, in order to see whether it was probable that the importation of any of these species into New Jersey would help in ridding the fruit-trees of that state of the San José scale. Professor Smith has returned and made his report in a bulletin which has been recently published. He explains that south of San Francisco the scale has been kept in check by natural causes, while north of that latitude the fruit growers themselves have had little assistance from natural enemies of the insect, but they have controlled its ravages by persistent efforts of their own. In southern California the twice-stabbed lady-bird and a chalcid parasite, together with climatic conditions, have kept the scale down. Both of these insects occur in New Jersey, but the lady-bird, so effective in California, survives the winters here in small numbers and does not appear on the trees until shortly before the scales begin to reproduce, so that the trees are covered with their larvæ before the beetle larvæ do any effective work, and from that point on, the scale outruns the lady-birds, breeding at least a month after the predaceous insects go into hibernation. The chalcid parasite forms a small factor in the history of the insect on the eastern coast. In California the scale does not begin to multiply until May, and the lady-bird breeds continuously and feeds upon the scale for from six to eight weeks, at least, while it is dormant. In January and February the scales are already preyed upon by the chalcid, and one full brood of the parasite matures upon the dormant scale and produces an enormous second brood when the scales begin to breed, eating up the majority of the young, and clearing out all but a small percentage before they reproduce in turn. Besides this, the intense heat, sometimes reaching 110 degrees in the shade, often kills the larvæ and the recently set San José scales. Of course, these climatic conditions cannot be duplicated in New Jersey. There is no evidence whatever that the Australian lady-birds introduced into California have had any influence in controlling the San José scale in that state.

The conclusion is that fruit growers of New Jersey must follow the example of those in northern California, and fight or lose their orchards. The California way is to treat the trees in the winter with a lime, sulphur and salt wash. Professor Smith gives a formula for several of these washes, but, unfortunately, they cannot be recommended as satisfactory in the east. A wash made of two pounds of good whale-oil soap to one gallon of water, thoroughly applied, has been successful in many cases in New Jersey. Since whale-oil soap varies in character, a wash consisting of concentrated lye, three and one-third pounds; water, seven and a half gallons, and fish-oil, one gallon, which makes a caustic soap, may prove useful. The lye should be dissolved in boiling water and the fish-oil added to the boiling solution. The whole is boiled for two hours, and then allowed to cool. This soap should be used at the rate of two pounds to a gallon of water, with a little lime sometimes added to make the treated part of the trees prominent, so as to insure thorough work. This soap should be dissolved in hot water, and is more effective if applied quite warm; the application should be made while the trees are dormant. There is much interesting matter in this *Bulletin No. 116*, issued by the New Jersey Experiment Station, to which we have not alluded, and it is worth careful study by all fruit growers in the east who wish to make anything like an effective stand against the dangerous San José scale.

Notes.

After the first form of this paper had gone to press we received the following note from Mr. Davenport relating to the hybrid Fern described and figured on pages 444 and 445: "I have just found two more plants of the type form of Aspidium

cristatum × *marginale* in Medford, Massachusetts, growing in a swamp near the one where my first Medford plants were found, and not far away, surrounded by plants of *A. spinulosum*, *A. Bootii*, *A. cristatum*, *A. marginale* and *A. Clintonianum*, more plants of a peculiar form collected by me in 1894. Under date of October 28th Miss Closson writes to me that she has also found several more plants of the hybrid in her vicinity."

The prices for American apples in Europe have advanced somewhat during the past few weeks, the improvement being due to the better quality of fruits shipped. The quantity exported is still phenomenally large. During the week ending October 24th, 148,779 barrels went to Europe from ports in the United States and Canada, and up to this time 1,081,647 barrels had crossed the Atlantic from this country, in striking contrast with the exports for the same period last year, when but 159,875 barrels had been shipped. At the sale in Liverpool on October 28th the demand was said to be very active at unchanged prices, which means about \$1.93 to \$2.17 for Baldwins, \$1.69 to \$1.93 for Greenings, and \$2.17 to \$2.65 for Kings. At the same sale the first shipment of importance of Newtown Pippins realized \$2.92 to \$4.82 a barrel.

No more delicate and beautiful offering of cut flowers is made now in the high-class florists' shops than occasional vases of pink *Bouvardia*, fifty cents being asked for a half-dozen clusters. Among the more refined flowers, too, are yellow daisies, their clear, velvety, lemon ray florets in beautiful contrast with the golden disk. In one of these establishments russet oak-leaves are used for embellishment, and in another mounted butterflies seem to hover among the rich masses of bloom, giving a novel, although not altogether an artistic effect. Perhaps no improvement in the flower business is more marked than the superior quality of flowers offered by street vendors, and the arrangement of these displays is sometimes remarkably ingenious in the limited space at command, and very tasteful and effective. Florists complain of dull business, although the great demand for yellow chrysanthemums for the sound-money parade caused a sudden and rather unexpected rise for this flower on Saturday. The comparatively new Rose, President Carnot, was sent to this market for the first time during the present week. It is a delicate pink, with petals shading deeper toward the centre.

A correspondent of *The Rural New Yorker* writes that one lesson of the abundant apple crop this year is that the orchards were planted too thickly in western New York thirty years ago. As the branches now interfere it is difficult to move ladders among the trees and difficult to spray, but the great loss comes from the want of color in the apples that grow in the more densely shaded parts of the trees. Even on Baldwins and other red-fruited trees which stand alone, dull-colored or green apples are found on the under side of the branches, and colorless fruit lacks flavor as well as beauty. It is hardly probable that there will be a heavy apple crop after the enormous harvest this year, and many of the trees are broken from overloading. If every other tree were cut out of these orchard forests, the remaining ones would have a chance to recruit and make the most of their opportunities in 1898 and afterward. The question of thinning the apples on a tree in such a time when the yield is so heavy is also a serious one. No doubt, fewer branches would be broken if the fruit had been thinned out in time, but how is it practicable to do this in a large orchard? When apples are so cheap careful thinning would not pay, and the quickest and most inexpensive way of shaking the fruit off or knocking it from the tree with long poles without regard to the individual apples and letting them fall at will seems a rough way of doing this work. It is true, also, that there is a limit to the desirable size of an apple. In a year like this, if the number of fruits on the tree were reduced the remainder would be of extraordinary size, and in some varieties, the Baldwins, for example, very large fruits will not keep well. Even on the overloaded trees of this year the Baldwins are as large as they ought to be.

Japanese persimmons were never seen here in such perfect condition as to quality, variety of form and richness of color, and the growing appreciation of this beautiful and luscious fruit is unmistakable in the large sales of it by wholesale merchants. The receipts of Jamaica oranges have fallen off considerably during the past two weeks, when business has been very dull, owing to the nearness of election. These oranges, packed in Florida boxes, sell for \$2.25 to \$3.00 a box at wholesale, and repacked barrels cost \$4.25 to \$5.00 for the best sound fruit. These prices are low, being twenty-five per cent. smaller than those of last year, and do not cover cost of transportation.

One reason given for the unfavorable change is the large crop of apples. Attractive-looking grape-fruits, from Jamaica, of medium size, sell for ten to twenty cents each at retail. The larger shaddocks are also seen in some collections, and these bring twenty-five cents each. Although the season proper for Cuban and Florida pineapples extends from the first of April to the close of August, this fruit is imported the year through. The kinds now seen are known in the trade as Egyptian Queen, long and cylindrical, a golden color and with small eyes. These now bring slightly lower prices than the sort known as Red Spanish, though they usually command more money. Red Spanish pineapples are somewhat globular in shape, with very luxuriant tops, large eyes, the prevailing color a golden-red, although a box of the fruits shows a rich variety of color, some being a deep bronze of different shades, and others shades of green. Spanish Queens sell now at ten to fifteen cents each in wholesale lots, and Red Spanish at twelve to twenty cents. Much more showy than either of these is the Smooth Cayenne. Those seen here now are quite green. This variety is of very large size, with immense tufts of leaves, in form similar to Egyptian Queen, and sells at forty cents and upward by the hundred. A few of the kind known as Mammoth Porto Rico, grown from plants transferred from the island of that name to the Keys and the Indian River section in Florida, are also very large and handsome, and command high prices. Seckel pears, from Boston, sell for twenty cents a quart, and the last peaches, from Maryland, at sixty-five cents for a basket holding thirty fruits. Lady-apples cost thirty cents a quart. Large, well-grown quinces sell for seventy-five cents for a half-bushel basket in the retail markets. Alligator pears, probably the last invoice for this season, bring ten to twenty-five cents each, and cocoanuts sell for ten to fifteen cents apiece.

Baron Ferdinand von Mueller, the leading botanist of the southern hemisphere, died in Australia on the 9th of October. He was born in Germany in 1825, and in his early manhood he emigrated to Australia on account of a tendency to pulmonary disease, and began life as a chemist. He was soon attracted, however, to study the native plants of his new home, and began those botanical explorations and labors which he kept up with unremitting perseverance throughout his life. In 1852 he made his first contribution to *Linnaea*, and since then he has been such a constant writer in scientific periodicals that the titles of his papers and books would cover many pages of this journal. There is hardly a botanist or horticulturist of any consequence in the whole world who has not been in correspondence with him, and few botanic gardens or herbaria which have not been enriched by specimens furnished by his zeal and generosity. He was a geographical explorer of rank, and he was associated with every movement for the promotion of science, literature and art in his adopted country, and was indefatigable in originating new industries. Of course, a man so active in so many directions made mistakes at times, but, on the whole, he was a most conscientious, earnest and eminently useful man. In botany, his monographs on the genera *Eucalyptus* and *Acacia* and of certain natural orders of plants are not only models of scientific acuteness, but have that practical quality which characterizes the great body of his work. California is especially indebted to him for Australian plants, large numbers of which flourish there as well as they do at home.

Philip Codman died suddenly on the 28th of October, of pneumonia, in Philadelphia, where he had gone a few days before on business connected with his profession. He was only twenty-nine years old, but such were his inherited tastes and capabilities, and so thoroughly was he schooled in the principles of landscape-art, that he was already on the highway to usefulness and distinction. After graduating from Harvard College he passed several years in the office of Mr. Frederic Law Olmsted, and after traveling extensively in the United States and Europe in company with Mr. Olmsted, and in Japan with his uncle, Professor C. S. Sargent, for the purpose of perfecting himself in his profession, he established an office in Boston a year ago and had already designed several important works. Like his brother, Henry Sargent Codman, who died at the same age while in charge of the landscape department of the Columbian Exposition, he had a vigorous constitution, and when he called at this office a few days ago he was the impersonation of health, and this makes his early death seem even more untimely. He had a pleasing address, an unselfish disposition and true manliness of character which won friends everywhere. His loss is a serious one to the profession in which there are so few men with sound artistic views, broad scholarship and thorough training.

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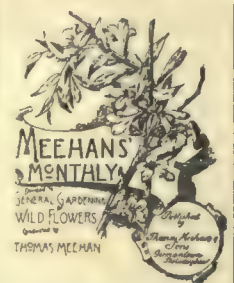
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Forestry and the New York Constitution.

IT is a matter for congratulation that in the midst of the unparalleled excitement of the late Presidential campaign the people of this state did not forget to kill the proposed amendment to its constitution which authorized the leasing of five-acre tracts in the State Forest Preserve, the selling of certain state forest-lands, and the exchange of lands without the Adirondack Park for lands within the Park. It is true that the amendment was so carelessly or ignorantly drawn that no distinction was made between the Adirondack Park and the Forest Preserve, which are quite distinct, but the intention was plain. No doubt, it meant to authorize the Legislature to exchange portions of the State Forest Preserve outside of the Park for private lands within the Park boundary, and although such exchange, if conducted with perfect honesty and intelligence, might in certain cases be advantageous, there has been so much crookedness and jobbery in dealing with the wild lands of the state that it is dangerous to remove any of the constitutional safeguards which have been erected to prevent further spoliation of our forest property.

We did not approve of the action of the Constitutional Convention of 1894 which made it impossible to cut or sell any timber on the state lands. We have never ceased to plead for the preservation of the North Woods, but we have urged that they should be made to yield revenue and grow more productive every year. This constitutional provision, it is true, put a stop to the selling of standing Spruce above a certain size, which was practiced under the form of law and which might easily have ruined large areas of forest; but it seemed to us, and still seems, a short-sighted policy to provide for a thriftless protection of the forest by sacrificing its usefulness. Absolute prohibition of the removal of wood, including even wood that is dead and down, from the state preserve simply means waste; but the convention, impressed with the shameful abuses which have been practiced under the name of forest management, felt justified in withholding from the people of the state the right to use what is their own, because they feared that through igno-

rance or greed they would not use it to the best purpose. So apprehensive were they of the dangers of mismanagement that they voted unanimously to prohibit any management whatever, and under the constitution as it stands trees must grow to maturity and die, and fall and rot, instead of being encouraged to develop into marketable timber and bring an income to the state. This means either that the convention did not know that there is such a thing as a rational forest management or that they were convinced that the people were so ignorant or vicious that they could not be expected to adopt any such system.

We believe that fundamentally the interest of the people in the forest and the interest of the lumbermen are one, and that no advantage will accrue to either by leaving the products of the forest go to waste. It is our opinion that the cause of forestry was not helped by the dissemination of such ideas by the constitution makers, and that the revised constitution was based on a serious misconception of the true relation of the forest to civilized society. It may be that our legislators are not yet to be trusted in so delicate a matter. But when we read Sir Dietrich Brandis' account of what has been accomplished in Burma in administering forest-lands in which half-wild and wandering tribes hold prescriptive rights, it is not creditable to our enlightenment that such an admission must be made. Nevertheless, the amendment which was killed on Tuesday was not a step toward rational forest practice. It did not provide for any intelligent or scientific administration of the state timber-lands; it only opened the door for greater spoliation. It certainly will not hasten the era of productive forestry to open state forest-lands to invasion by railroads or to lease them out in five-acre patches to campers. What should be provided for is the beginning of systematic forest policy. This would be an object-lesson of inestimable value. It would correct false views and encourage the establishment of skilled forest economy not only in the public, but in the private, timber-lands of the state. This is prevented by the constitution as it is, but matters would be much worse if there were coupled with this prohibition the chance of trading and leasing, and the general demoralization and destruction which might follow.

After all, there is something gained when the people have made up their minds to protect the woods even if they do it unwisely. Let us hope the time will soon come when popular sentiment will be so enlightened that it will be safe to trust the officers of the state to organize and develop a system of rational forest practice, when there will be no fear that our people are too ignorant to do this in a scientific way, and no fear that their moral sense is so dull that they cannot administer a trust like this without official corruption.

A CORRESPONDENT who has recently visited Niagara Falls writes in a disheartened way about the work on both sides of the river. Great care has been taken on the Canadian side to give the reservation a dressy look with smooth lawns and parterres, and beds of plants with bright foliage such as we sometimes see around pretentious villas. The woods have been cut away or thinned out, so as to give an open and park-like effect, and everything that is rugged has been toned down and civilized. The power-house connected with the electric plant has a sluiceway which discharges through a square hole in the wall of rock, and a little stream of waste water squirts out into the abyss in ludicrous competition with the Horseshoe Falls, just above it. On the American side the reservation proper is fairly well cared for, and an attempt is made to save the fringe of native trees and shrubs on the banks of the rapids and Goat Island. But from the last of the Three Sisters, the view up the steep slope, down which the tumbling waters rush, has been hopelessly vulgarized. Instead of the skyline of forest and rapids there are rods of brick walls and smoke-belching chimneys; and yet the companies want more. Of course, the river still thunders over the preci-

pice, but this is only a part of the spectacle, and its general effect is weakened by the destruction of the original setting of the picture. Perhaps it was not practicable to set these buildings back from the river and mask them somehow with a belt of forest. But it may be taken for granted that the eminent engineers who planned all this never felt that any reverence was due to this sublime spectacle, and the capitalists who employed them naturally cared for profit, without a thought that such a spot as Niagara ought to be the possession of the world. After all, we should, perhaps, be thankful that there is so much of grandeur left to us, and we should congratulate the people of New York and Canada that they had a sufficiently high appreciation of the great cataract to make some effort to preserve it. Nevertheless, it is not creditable to our civilization that we have permitted any defacement whatever of this world's wonder.

Autumn Birds in the Pines.

IN September and during pleasant days in October we see more birds here than at any other time in the year. The migrants come flocking in from the north and stay with us for several days, and during this time many are flitting about that do not remain with us either in the summer or in the winter. Among the most lively species are the various warblers. Sometimes in early morning large flocks of the yellow-rumped warbler appear as if they had suddenly dropped in the night. Mingling with these is the charming little black-throated blue warbler, flitting here and there, catching insects on the wing, frolicking with its companions and performing gymnastic feats almost equal to those of the chickadee. Its throat and the sides of the body are jet-black; the back is blue—not a brilliant but a faded blue; the under side is white. Its sprightliness and pretty markings make it conspicuous among its numerous relatives. The red-poll warbler is also here and stays later than most of the others. It has a dull red crown, with a dusky olive back, while it is a bright yellow below. The handsome Pine warbler is very abundant, pale yellow above, with deep yellow breast and white wing-bars. It is one of our largest warblers, and I think it must breed with us, but I have not been able to find its nest, although I have noticed it in the Pine-woods in summer, and in the autumn it often comes about the house in numbers. The interesting little Maryland yellow-throat nests with us, and this season a pair brought their young near the door. It is a fine songster throughout the season, and in the autumn many others join them here from more northern sections, when they halt and play for several days before their departure to a warmer climate.

This autumn great flocks of seed-eating finches and sparrows came with the warblers. Even the winter bird, Junco, came two weeks earlier than I ever before observed it, in immense numbers, but most of these early arrivals disappeared with the warblers. Many winter here as well as in the more southern states, all the way to Florida. The handsome tree-sparrow is abundant now, flocking in from the northern mountains where it spends its summers. Many of these, too, will go farther south, but a goodly number will remain all winter with the song-sparrows, and the beautiful white-throated sparrow, which is a good songster in pleasant weather, even in winter, but it does not equal the song-sparrow in the volume and variety of its notes. The swamp-sparrow seems to be everywhere in the damp Pines, but it seldom comes about the house. It is darker-colored than most of the other sparrows and is more shy and retiring.

This autumn for the first time I noticed the white-crowned sparrow. The top of its head is pure white, bordered with black. It is an attractive bird, but not as handsome as the white-throat, which comes about our doors in winter, and almost to our feet for food. The fox-sparrow is another handsome species, most numerous in autumn, but a few remain all winter. In color it somewhat resembles the long-tailed thrush, but with deeper and richer hues of dark

bay or rufous. It is an active bird, and even larger than the white-throat. Like the brown thrush and chewink, it seems to delight in making the dry leaves fly; several are now near my window scratching among the leaves which have settled around a clump of Lilacs. It has an amusing way of striking with both feet without raising its wings, and then looking about to see what choice morsel has been uncovered. Evidently it likes a meat diet as well as seeds. How little the most of us realize how vast an amount of noxious insects and how many seeds of noxious weeds these birds consume. In winter large flocks may be seen foraging in our fields, gardens and waysides, picking up untold quantities of the eggs and chrysalids of insects as well as seeds.

The winter birds return to the same neighborhood and haunts, year after year, with the same regularity as the summer birds. When the ground is covered with snow I have mingled cracked hickory-nuts with the grain I fed them. When I first offered this unaccustomed food it was left, but now and then, after the grain was gone, a bird would pick at the nuts, and, finding them good, soon learned to take them in preference to anything else. Then another and another learned the trick. The slate-colored winter sparrow, Junco, the white-throat and Fox and song sparrow all took the nuts sooner than the grain. They would snatch a piece of shell and fly a little distance, pick out the meat and return for more; and very expertly some of them managed to get the meat. When one chanced to secure a piece that was difficult to master he would put one foot on the shell and hold it while he probed and brought out the refractory morsel, but not all were equal adepts in this; some even of the same species were not as quick-witted as their companions, and I have often observed the same thing in birds when eating the seed from grass-heads. Some will take a stalk, bend it down and hold it firmly while they pick out the seed; others will have a hard time to capture seed from the swaying stalk.

The following winter, after the birds have learned to eat the nuts, they do not need to be retaught, but remember their lesson, and at once take the shells. The young that come with the old ones at first stand aloof and eat the grain, but it is not long before they, too, are preferring the nuts. The young are not as decided in color as the old birds, and other characteristics go to show the old from the young.

Our little field sparrow is more abundant in autumn; at least, we see more of them than in summer, and in winter it is as familiar as the little chippy is in summer. It is about the same size as the chippy, but has more of a reddish cast. It belongs in the genus *Spizella* along with chippy; in fact, all the members of this genus are small, except the tree sparrow, *S. monticola*, which is nearly as large as the song sparrow. All of our sparrows are neat and dainty in habit, wholly unlike the scavenger of our streets, the English sparrow, which in many places, especially on our churches, make sad havoc with the Ivy. Perhaps it has a hereditary recognition of the Ivy as one of its home plants.

The little goldfinch has put on its winter dress and is doing what it can toward exterminating many pestilent weeds in all neglected places. Just now a party of them are investigating the Cosmos seed in the border. Either it is not in the right stage to suit them, or, for some reason, they have concluded it is not wholesome, and have gone to the heads of Zinnia, which suit them much better. Some of them are swaying among the plumes of the tall Pampas grass—graceful, merry bodies, remaining with us the entire year. Their neat lichen-covered nests are now conspicuous among the branches of partly denuded trees. A near relative of theirs, the Pine linnet, is returning from the north, where it goes to rear its family. These, too, are jolly birds, and will stay with us all winter, making the dry seed fly from the Pine cones, and then whirling and performing gymnastics in the air so as to catch it before it falls to the ground.

Among the larger birds now abundant are the robin and the bluebird, both of which remain all winter. The cries of the blue jay and crow are familiar sounds, and the clatter of the handsome goldenwing is heard all around, with the tapping of many other woodpeckers. During these mild October days, especially in the evening, we hear the harsh cry of the tattlers in the damp pines, and the soft whistle of the plovers returning from the far north. Many of them halt along our coast until severe weather sends them farther south. The killdeer plover, unlike the others, remains with us all summer, and we still hear its cry, together with other unfamiliar notes and sounds that set us to wondering what their source may be, and remind us how much we have yet to learn.

Vineland, N. J.

Mary Treat.

Conifers on the Grounds of the Kansas Agricultural College.—I.

SCOTCH AND AUSTRIAN PINES.

THE plantings of conifers on the grounds of the Kansas Agricultural College have been made from 1872 up to the present date, and have embraced most of the more important genera and species, but of all those planted the ones set in the greatest numbers and the ones which, on the whole, have proved most satisfactory are the Scotch and Austrian Pines. Of these two sorts it is difficult to say which is the superior for this climate, but either should prove quite satisfactory. The oldest specimens of these on the College premises are in two belts on what is known as the Old College Farm. They were set in 1872 and 1873, and were then two and three years of age. One belt consists of mixed Scotch and Austrian Pines, the other entirely of Austrian. The land is the average high upland prairie, with a gentle slope to the north and east, and the soil is a clay-loam about twelve inches in depth, with a rather stiff clay subsoil. In the mixed belt the Scotch Pines do not seem to have withstood the hardships to which they have been subjected nearly as well as the Austrian, for while there are three or four of the smaller Austrian Pines which are dead, there are a dozen or more of the Scotch, some of them large trees, which evidently do not owe their death to crowding, as seems quite likely to be the case with the Austrians. In this belt sixty-five Austrian Pines average $27\frac{1}{2}$ feet in height, 8 inches in diameter at the ground, $6\frac{1}{2}$ inches at 2 feet, and $5\frac{1}{2}$ inches at 6 feet. The ten trees having the largest diameters give the following averages: Height, 33 feet; diameter at the ground, $10\frac{3}{4}$ inches; at 2 feet, 8.9 inches, and at 6 feet, 7.85 inches. From measurements taken in this same belt by Professor Mason in 1888 I obtain the following figures for the ten largest: Diameter at the ground, 9 inches, and at 6 feet, $6\frac{1}{2}$ inches. Only nine Scotch Pines are now living, and these average as follows: Height, $32\frac{1}{2}$ feet; diameter at the ground, 9 inches; at 2 feet, $7\frac{1}{2}$ inches, and at 6 feet, $6\frac{1}{8}$ inches. The largest ten in 1888 averaged 7 inches in diameter at the ground, and 5 inches at 6 feet.

The belt of Austrian Pines contains 128 trees, which give the following average measurements: Height, 27 feet; diameter at the ground, 10 inches; at 2 feet, 8 inches, and at 6 feet, $6\frac{1}{2}$ inches. The ten trees having the largest diameter average as follows: Height, 29.8 feet; diameter at the ground, $13\frac{1}{4}$ inches; at 2 feet, $11\frac{1}{4}$ inches, and at 6 feet, $9\frac{1}{2}$ inches. In 1888 they averaged 10 inches at the ground, and 7 inches at 6 feet. The tallest single specimen in this belt is $36\frac{1}{2}$ feet in height, with a diameter of $13\frac{3}{4}$ inches at the ground, $11\frac{1}{2}$ inches at 2 feet, and $9\frac{3}{4}$ inches at 6 feet.

It is an interesting point that in twenty-four years forest conditions have been so far established in these belts that young seedlings of many forest trees are found there, *Quercus acuminata* being especially abundant, though the nearest acorn-bearing trees are over half a mile away. And what is still more interesting, Pine seedlings are quite

abundant under many of the trees in both belts. Whether this has ever occurred before, and the little seedlings have succumbed later on, is not known, but the fact that Professor Mason has repeatedly tried to find seeds with sound embryos, and never succeeded, and that this year quite a number have been germinated in flats in the propagating-house might indicate that for some reason the seed matured by the Pine-trees last year has more vitality than in former years.

On the lower college farm is another plantation of Scotch and Austrian Pines, set in the spring of 1891 at two years of age. They are on the flat at the foot of a hill, and the soil is a fine deep clay loam. They have been given clean cultivation since setting, and though several seasons have been very dry, they have probably had, on the whole, exceptionally favorable conditions. There are 319 Scotch Pines, and they give the following average measurements: Height, $7\frac{1}{2}$ feet; diameter at 1 foot, $2\frac{1}{4}$ inches. The highest tree is 11 feet and the largest diameter, $3\frac{3}{8}$ inches. The Austrian Pines join the Scotch on the west, and the soil and other conditions are practically identical. There are 334 trees, which average as follows: Height, 5.37 feet; diameter at 1 foot, 1.89 inches. The highest tree is $7\frac{3}{4}$ feet, as against eleven feet in the case of the Scotch Pines, and the largest diameter, $3\frac{1}{4}$ inches, as against $3\frac{3}{8}$ inches. This, it will be seen, gives the Scotch Pine in this plantation a much better showing than the Austrian. It will also be seen that this gives an average increase in height of a trifle over one foot a year for the Scotch Pines, and about three-fourths of a foot for the Austrian. It is interesting to note in comparison with these figures that twenty-five Scotch Pines, selected at random from among the 319, averaged at the beginning of the season of 1896, 7.3 feet in height, an average increase of 1.04 feet for each year of the tree's age. On August 14th they showed an average increase in height of 26 inches for the season, the greatest growth being 37 inches. Twenty-five Austrian Pines selected in the same way averaged at the beginning of the season 5.42 feet in height, a yearly increase of .774 foot. On August 14th they gave an average increase in height for the season of 21 inches, and the greatest growth was 29 inches, as against 37 inches for the best Scotch Pine.

As shelter, either for orchards or for stock, these two species seem admirably adapted to this country, while as timber trees they would seem to be the equals, if not the superiors, of most deciduous trees.

Agricultural College, Manhattan, Kansas.

F. C. Sears.

[The Scotch and Austrian Pines grow rapidly in the northern and middle western states, and are extremely promising for twenty or thirty years. As a rule, however, they suffer from various diseases, and are short-lived here, so that it is wise to use them cautiously. No other ever-green trees, it is true, have produced wind-breaks more rapidly on the western prairies, while no other trees which have been planted on a large scale in the United States have, in the long run, proved so disappointing. Our native White Pine is more difficult to raise from seed, and, therefore, more expensive, and for the first ten or twelve years it grows less rapidly than these European species, but it lasts much longer on the prairies, where we have seen these trees tried together, and it is no doubt much more satisfactory in all the northern states for general planting.—ED.]

Plant Notes.

Have we Two Native Species of Trumpet-flower?

THE blooming, simultaneously, of two native Trumpet Vines on my place has explained to me what has hitherto been a puzzle to me, namely, the statement in several horticultural journals, GARDEN AND FOREST among the number,* that the flowers of the Chinese species, *Tecoma*

* See vol. iii., p. 392, Fig. 50.

grandiflora, are more showy than those of our native species—a statement which surprised me, since the foreign species certainly is less brilliant in color than the native flower with which I am most familiar, and to which I wish to call attention. The fact is, we have two very distinct native varieties, if not species. The smaller and duller-colored form is, perhaps, the more common one in cultivation, or possibly the only one cultivated at the north; and if comparison is made between this and the Chinese species it will undoubtedly be to the advantage of the latter. Both the native varieties have flowered on my place this year, and the differences between the two are so numerous and conspicuous that I cannot help thinking that one of them must be unknown to horticulturists.

My specimen of the variety with smaller and duller-colored flowers was obtained from Thomas Meehan & Sons, Germantown, Pennsylvania; those (I have several) of the large-flowered variety I dug up myself in the bottoms of the Northwest Branch, Prince George County, Maryland, just outside the north-east boundary of the District of Columbia. The latter bloomed some two weeks earlier than the former, but is still in flower, the other being also now in bloom; and as I have had the opportunity of comparing them carefully, I am convinced they are at least varietyally distinct, the principal points of difference being as follows:

SMALL-FLOWERED VARIETY (TRUE T. RADICANS?): Flowers, 2-2½ inches long, 1¼-1½ inches broad; *tubular portion straight, not longer than stamens*. Color: Front, dull flame-scarlet; * tube cadmium-orange on top, slightly paler orange on under side; back of reflexed portion, salmon-color, not distinctly different from color of tube; calyx, tawny olive above, gallstone yellow, tinged with olive beneath. Foliage: Leaflets, 7-13; dark green, *distinctly glossy* above, grayish green (between pea-green and malachite) beneath, with fewer, coarser teeth.

LARGE-FLOWERED VARIETY: Flowers, 3-3½ inches long, 2½ inches broad; *tubular portion strongly curved, much longer than stamens*. Color: Front, deep and pure red (between poppy-red and carmine); tube, poppy-red on top, orange-vermilion on under side; back of reflexed lips, deep salmon-color, distinctly paler and duller than color of tube, even of under side; calyx, rich reddish brown (approaching claret-brown). Foliage: Leaflets, 7-13, yellowish green (dull parrot green) and *not at all glossy* above, pale yellowish green (bice green) beneath; teeth smaller and much more numerous.

Both forms are found in the District of Columbia, but which is the more common one I am not at present prepared to state. The two localities where, in my experience, the Trumpet-flower is most abundant, are in lower Maryland, near Point Lookout, and in the bottoms of the Embarras River, in Jasper County, Illinois. At the former place it was rampant everywhere along the roadsides, clambering over fences, shrubbery and low trees, while in the latter it bedecked practically every tree throughout the woods. Although in full bloom during my visit to both places, I paid no particular attention to the flowers, the question of two forms not having then occurred to me. But my impression is that the Point Lookout flowers were all of the small orange-colored type, and those of the Embarras bottom of the large red type; but this is no more than a vague impression, which may be erroneous.

Brookland, D. C.

Robert Ridgway.

New or Little-known Plants.

Vitis Doaniana.

VITIS DOANIANA, a wild Grape, native of the Texas Panhandle country, described and named by T. V. Munson, of Denison, Texas, has shown itself in the experimental vineyard here to be hardy beyond almost any other Vine. It is a rampant grower, encroaching on its neighbors every year, and often in a single season making a growth of from fifteen to twenty feet. The vines do not

branch as much as they do in most other species, and the young canes as they ripen in the fall become a rich dark brown. The upper surface of the leaves and the young canes are covered with a white, cottony pubescence, which adheres more or less to the leaves until they fall in the autumn, and to the canes until they are a year old. In the younger parts this is sufficiently abundant to give them quite a whitish appearance. The lower surface of the leaves is still more abundantly covered with a more villous pubescence, which, being less exposed to the action of the weather, remains intact till autumn. The leaves themselves are of a light bluish green, and the whole effect (see fig. 59, p. 455) is peculiar and quite characteristic.

The bunch is rather loose, irregular in shape and often shouldered. The berries on different vines vary greatly in size, ranging from fully as large as Catawba down to the size of a pea. They are jet-black and covered with a thick bloom, and, for a wild grape, the flavor is by no means bad. The seeds, in size and general outline, resemble somewhat those of *Vitis labrusca*, but the beak is not so long and the chalaza much more distinct in outline. Another peculiarity is a narrow, well-defined depression extending from the chalaza to the beak, which, so far as I have been able to observe, is found in no other species except *V. Solonis*.

Its vigor of growth, general hardiness under adverse climatic conditions, and its comparative immunity from all fungous diseases should make it most valuable either for stocks or for hybridizing with a view to continuing these characteristics with the fruit characters of some of the improved varieties. The fact that it is a vigorous grower, bearing abundant foliage and retaining its leaves unimpaired in color till frost comes in the fall, should commend it for use on arbors or for covering unsightly places.

Agricultural College, Manhattan, Kansas.

F. C. Sears.

Cultural Department.

Notes on Gooseberries.

THE native species of Currants and Gooseberries have as yet but very few representatives among varieties which are cultivated for their fruits. That this should be true of Currants is not surprising, for the various red, white and black fruited kinds of European origin have generally succeeded so well in the older-settled portions of the northern states that no great need has been felt in those sections for attempts to introduce improved native varieties. In the south-west, where the European varieties do not thrive, some attempts have been made to supply their places with selected varieties of the native species, *Ribes aureum*. This species is commonly known as the Missouri, or Buffalo Currant. It bears spicy-scented long yellow flowers and yellow or metallic blue-black fruit, and is sometimes grown as an ornamental shrub. Crandall, Jelly, Utah, Golden and other varieties of this species have been introduced within the last fifteen years. While the best of these are desirable in portions of Kansas, Oklahoma, Texas and other sections of the south-west, where a good substitute for the European varieties is greatly needed, yet none has as yet been extensively planted where the European kinds can be successfully grown.

But with Gooseberries the case is different. European kinds have usually proved unsuccessful in America on account of the ravages of the mildew, *Sphærotheca Mors-uvæ*, so that there has been more of a demand for the introduction of selected varieties of native origin than there has been for the introduction of native Currants. Although this demand has long existed, the progress in this direction has been much less rapid than it has been with either the native Grapes or the native Plums.

The number of cultivated Gooseberries which have descended purely from native species is really very small; in fact, it is doubtful whether any of the well-known kinds are of purely American origin, except Pale Red, also known as Cluster, American, etc., which was introduced into cultivation many years ago. It appears to belong purely to *Ribes oxycanthoides*, which species takes its name from the resemblance of its leaves to those of the English Hawthorn, a resemblance that is more noticeable, however, in the leaves of the Downing than in those of the Pale Red.

Ribes oxycanthoides, to which most of the native culti-

* Names of colors used here are those of the writer's *Nomenclature of Colors* (Little, Brown & Co., Boston).

vated varieties belong, either partially or entirely, is more common in New England than in New York. Its range extends northward through Canada and westward to California. Its fruit is red or purplish, with smooth thin skin. It has shorter stamens and broader calyx lobes than *R. rotundifolium*

European Gooseberries. The slender branches arch or droop gracefully in marked contrast to the thick, straight branches of the European *R. Grossularia*.

Houghton resembles Pale Red very closely in foliage and fruit, but its habit of growth is less upright. Possibly it be-



Fig. 59.—*Vitis Doaniana*.—See page 454.

has, and it is also characterized by very short peduncles. It is sometimes armed with short prickles between the nodes, or the lower parts of the canes may be thickly beset with prickles. The prickles which occur beneath the axils of the leaves are short and slender as compared with those which characterize

longs purely to the *oxyacanthoides* species, but a study of seedlings of known parentage which I have grown suggests that it is a hybrid between *Ribes oxyacanthoides* and *R. Grossularia*. Pure seedlings of it grown here have not yet fruited, but they show no marked *Grossularia* character so far as foli-

age and habit of growth is concerned. Nevertheless, two of its well-known seedlings, Downing and Smith, are clearly hybrids between *R. oxyacanthoides* and *R. Grossularia*, and I have some crosses of Pale Red by Houghton which show *Grossularia* ancestry, but the pure Pale Red seedlings do not.

Downing, which is generally called the standard of excellence among the native sorts, is a seedling of Houghton. Its foliage and the size, texture, flavor and thin skin of its fruit indicate its relationship to *R. oxyacanthoides*, but the color of the fruit, thick spines and thick, scarcely curving, canes indicate *Grossularia* parentage. The opinion that it is a hybrid of *R. oxyacanthoides* and *R. Grossularia* is confirmed by a study of its pure seedlings, most of which resemble Downing in habit, and some of them show marked *Grossularia* character.

Pearl, another hybrid of *Ribes oxyacanthoides* and *R. Grossularia*, is from seed of Downing fertilized by Ashton, an English sort. So closely does it resemble Downing that it is difficult to tell the difference between the two, either in bush or in fruit. In some sections it is said to be more vigorous and productive than Downing, but it has proved less productive so far as tested here.

Smith, or Smith's Improved, a seedling of Houghton, has fruit equal to Downing in size, or even larger. The green color of the fruit and shining upper surface of the leaves, together with other features, indicate that it has originated partly from *Ribes Grossularia*. Some of its crosses with Pale Red also show characters of the same species.

Mountain is of especial interest since it is the only cultivated variety I know which represents *Ribes Cynosbati*, the most common wild species of this and many other sections of New York state. Its tall canes, sprawling branches, the dull brownish purple color of the fruit and the very dark green pulp are all *Cynosbati* characteristics, as are also the beautiful brown and red colors of its autumn foliage, quite unlike the yellow or occasional dull brown tints of the European kinds.

The fruit, which is very large for a native Gooseberry, has smooth and thick skin, which indicates *Grossularia* parentage, for *Cynosbati* fruit is smaller and the thin skin is usually beset with prickles. The glossy upper surface and somewhat leathery texture of the foliage also indicate its *Grossularia* parentage, since *Ribes Cynosbati* has soft pubescent leaves that are not at all leathery, neither glossy. Although this variety is of some interest botanically, it is not productive enough to merit cultivation for its fruit.

Viewed from the standpoint of the practical fruit grower, the Gooseberries which have been cultivated in this country fall readily into two classes, namely, those which are liable to injury from attacks of the mildew, and those which are not. Although it attacks other species of *Ribes*, yet in this country the mildew finds all varieties of the European Gooseberry particularly susceptible to its attacks, including, of course, the American-grown seedlings of this species, even though they are catalogued as American Gooseberries. For this reason the varieties which have found their way into general cultivation in this country, either like Pale Red, belong purely to a native species, or like Downing, Mountain and Pearl, are hybrids between an American species and the European *R. Grossularia*. Thus it happens that the classification into successful and unsuccessful varieties which practical American fruit growers have felt compelled to accept, follows closely, though, perhaps, unconsciously, the lines defined by botanists long ago for the classification of the species.

It is now known that by a wise regard for sanitary conditions, and by systematic and thorough use of fungicides, some European Gooseberries may be successfully grown in various parts of this country, so that it is reasonable to expect that the fine colored, large and really excellent fruit of the best English Gooseberries will become more common in American markets than they have been in the past.

Geneva, N. Y.

S. A. Beach.

The Cultivation of Mushrooms.

IT has always been considered that there was more or less of legerdemain in the successful growing of Mushrooms, and many old-time cultivators made this supposition seem probable by various pretenses which had little foundation in fact. Many people object to eating Mushrooms for fear of spurious varieties which are known to be poisonous, and great care must be exercised when gathering them in the fields, but under cultivation there is no danger whatever. I have never known any other species of fungus to be produced in the Mushroom beds that approached *Agaricus campestris* near enough in appearance to be mistaken for it, and cultivated specimens may be safely eaten with no fears as to the results. Very recently a popular interest in mycology has sprung up,

and there are now two flourishing societies in this state which have meetings and exhibitions for the better study of fungi and their edible species. These meetings and increasing observations by the mass of the people will help to do away with a great deal of the ignorance and superstition about this family of fungi, and anything that will help to make better known and appreciated these esculents will be a public benefaction.

Ever since we have begun to grow the Mushroom under the greenhouse benches we have never had to record a total failure, and some of the crops have been most successful. We are exceptionally situated for obtaining material for the beds, and this is a primary requisite, it being essential to collect this quickly so as to have enough in bulk and to get the whole in a warm but moderately dry condition before any part of it has lost virtue by becoming cold. It is best to collect all that is possible each morning, throwing out all long straws, and, when sufficient is obtained, letting the heap heat moderately, say for two days, before turning it over, and keeping up this while forming another heap of the newer material to be treated separately, making up a bed as fast as each heap is in proper condition—that is, when rank gases have been eliminated and excess of moisture evaporated by warmth and exposure. It may be safely considered fit to make up in beds when a handful can be taken up without soiling the hands or moisture felt to be present. One of our mistakes, that was not apparent for some time, was making the beds too deep, and this resulted in overheating when the beds were made up. But as the Mushrooms were produced only about the outer edges of the beds or where the new bed was joined on, this led to the discovery of the fault. Now we never make a bed more than ten inches deep at the back, and sloping gently to six inches at the front of a four-foot bed. Under these conditions the temperature never seems to get beyond control, and rarely exceeds 100 degrees, Fahrenheit.

The firmer the beds are made up the less violent the heat at first, and the longer it will last, and it will produce quicker returns. A short-handled mallet is useful in compacting the beds. We wait until the maximum temperature has been reached, and spawn when the temperature is falling at about 95 degrees, and add a coating of fresh loam a day or two after, with water as often as necessary to keep the surface moist, always using tepid water to prevent chilling the beds. If it is found that the heat rises to an undesirable degree, a watering will often cool it down sufficiently, but should the heat get beyond 100 degrees, either before or after spawning, it is better to take the whole out and make it over rather than risk a failure.

A good quality of the spawn is essential to success, but not half the failures attributed to spawn of inferior quality rightly belong there. For the last two years we have been very successful in getting some that was really good, with no traces of mycelium that had started into premature growth. Always avoid spawn that has a growth of white threads on the bricks, as this is an evidence of premature germination of the mycelium. This is what ought to take place when it is planted in the beds, but it is too often induced by improper conditions before it reaches the planter. When one bed is made up and another is about to be commenced, we take enough bricks of spawn and lay them out on the top of the bed and turn every second day or so. This renders the bricks less dry, so that they are more easily broken, and rapid growth begins as soon as planted, and a week or two is saved in bringing up the crop.

Nitrate of soda is an excellent stimulant for Mushroom beds when they seem to be past bearing. A partial drying off, and then a good soaking with a weak dilution of nitrate, will start up a good second growth that will sometimes equal the first.

Our beds are formed under the greenhouse benches in a structure where Chrysanthemums and Carnations are grown, and the temperature of the house is kept at 50 during the winter. This suits the crop well, and when in bearing a cloth is tacked about the bed to keep it dark and give more even conditions as to moisture and heat; that is, the heat generated by the beds themselves will be held, and if the temperature chances to fall below 70 before the crop is well up, a good covering of hay will bring the heat up to the surface and raise it several degrees. Sudden fluctuations in temperature are in this way easily avoided.

There is no better time than the present to start a bed. Flies are very troublesome in the structure from early formed plantings, but from this time on there will be no trouble from them, and if an airy shed or barn floor is available for the preparation of the manure no great difficulty need be anticipated in the production of plenty of Mushrooms during winter, when they are always a welcome addition to the short list of available table vegetables.

South Lancaster, Mass.

E. O. Orpel.

Hardy Ornamental Grasses.

AS outdoor decorative plants these Grasses are gaining favor every year. When once planted out the only care they need is cutting down the withered stems annually, giving a little mulching and reducing the size of the clumps when they become too large. If planted either in large beds wholly by themselves or associated with such plants as Cannas, Ricinus, Aralia papyrifera, or the taller-growing perennial Sunflowers, they make a most telling display. The tallest of the species in common use, not including the Bamboos, is the *Arundo donax*, which under favorable circumstances makes an annual growth of about fifteen feet and dies down each autumn to the crowns. It completes its growth by the end of July, and afterward sends up large panicles of flowers. The variety named *Versicolor* has the leaves ribboned with white; it only grows about six feet in height, and this is one of the most desirable of all the Grasses. It is easily propagated by placing the full-grown stems lengthwise in wet moss or water, in a moderately warm house. In a short time the small shoots in the axils of the leaves will take root, when they should be separated from the parent stem and put into small pots. Pieces of the thick roots cut up into lengths of about two inches and put in ordinary soil in a cool house will grow well. *Erianthus Ravennæ* is next in importance; it grows to a height of about ten feet, the leaves are very long and narrow, the panicles stand well above the foliage. This Grass is well suited for planting singly in wide borders. There are two forms under the same name, but they only differ in height and time of flowering. The flower-heads are very little inferior to those of the well-known Pampas Grass, and if they are cut before full development takes place and dried in the sun they are quite as handsome. It is best increased by dividing the roots. It will ripen seed, but in the seeding stage the plants have to be closely watched, as the English sparrows are very fond of it. The Japanese *Eulalias* (*miscanthus*) form a valuable group. *E. Japonica* is a dense grower, about five feet in height; the leaves are narrow, with a faint whitish band down the centre. The variety *Variegata* is longitudinally marked with white; *Zebrina* is marked transversely with yellow blotches. Another species known as *Univittata* is not quite so tall as the three first mentioned; it forms a very beautiful plant in an isolated position; it has narrow green leaves, with a light strip down the centre of each. The *Eulalias* are best increased by division; this should be done in the spring-time just when the plants are starting into growth; old plants may be dug up and with a hatchet cut into pieces small enough to go into three-inch pots. Keep in a shaded frame till they are rooted.

Among the many low-growing Grasses the most useful is *Pennisetum longistylum*, which, when planted in suitable soil, is never out of bloom during the entire summer. Plants of this sometimes get winter-killed with us when left out-of-doors, and we therefore usually dig up the clumps and put them under sash for the winter. Plants raised from seed early in the season do well enough, however. A nice bluish-gray Grass for edging is *Festuca glauca*. It grows in dense tufts about eight or ten inches high. Another Grass of the same color is *Elymus glauca*, with a rather straggling habit, but when grown in masses this fault is not obvious. This Grass is of a most desirable color, and it grows to be about eighteen inches high. For dwarf variegated Grasses the variety of *Dactylis glomerata* is the best with us, although the variegated *Bambusa Fortunei* is a more permanent plant. We have tried several of the Bamboos for the last few years; those which have proved hardy here are *B. sulphurea*, *B. mitis*, *B. Simonii*, *B. chrysanthæ*, *B. Ragamowski*, *Arundinaria metake* and *A. gigantea*.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Notes on Chrysanthemums.

FOR a number of years I have noted the development of *Chrysanthemum*-blooms from the time the buds show color until they are fully open, and also the effects of artificial heat and moisture, especially on the colors of the flowers. It used to be difficult to hold our specimen plants of Louis Boehmer until exhibition time, usually the first week of November. When the variety was first introduced the blooms showed color on the 25th of September. Every year since it has been a few days later, and this season it did not show color until the 11th of October. If the exhibition had been held this year during election week it would not have been in bloom. The first year I grew *Portia* it was difficult to hold. The next season it was a week too late, while this year it is

again a few days too early. W. H. Lincoln has been growing later. It is unusual now to have bloom fully open for our exhibitions when held during the first week of November, though a few years ago I remember exhibiting flowers of this variety at the Madison Square Garden, New York City, on the first of November. Although the exhibition this year at Boston is a week later than usual, our specimens of W. H. Lincoln will not be quite finished until the end of the week. Compared with several other late varieties, it is the slowest. S. T. Murdoch and Kitty Sanders were later in showing color than W. H. Lincoln, while Gretchen Büettner, Louis Boehmer and Georgiana Pitcher were at about the same stage. All are now advanced further than W. H. Lincoln, which is the last on the list. The loosely built incurved flowers always open more quickly than the denser reflexed types, and pink and white colored flowers open faster than yellows and reds.

Artificial heat in the development of blooms acts curiously. It does not have the same effect on *Chrysanthemums* that it would have on other plants. Naturally, one would expect that heat would accelerate, and cold retard, the progress of opening. Such plants as I have in cold frames are as far advanced as they would have been if kept in a temperature ten degrees higher. To keep the plants in good trim it is essential to exclude frost, and that would appear to an ordinary observer all that is necessary. The effect of artificial heat on color appears to have a more important bearing. When the night temperature falls below fifty-five degrees all dark colors fade. I consider the settling of moisture on the blooms, as it must do when there is no fire-heat, detrimental to high color. It is essential to keep up a dry moving air. When it was necessary to hold back some early varieties I allowed the temperature to fall as low as I safely could, with the result that the brilliant hues of G. W. Childs and *Cullingfordii* vanished, leaving them a tawny red. Of recent years the high and perfect coloring of my specimens of G. W. Childs and *Cullingfordii* has been noteworthy. This is especially true this season. Two weeks ago one would say G. W. Childs was ready for the exhibition, but to-day the glossy crimson tones are as true as at that time, while the flowers have built up to almost double the size. The effect of heat on the pink varieties appears to be the same as upon the reds. I think there is a liability among the yellow varieties to lose their brightness; at least, there does not appear to be the same necessity of heat to maintain their natural colors. White-flowered kinds seem to be benefited by a warm stirring air. The glistening white of Ivory never shows so grandly under lower temperatures. Such doubtful varieties as G. Daniels, Theo and Silver Cloud bleach out to a pure white.

Wellesley, Mass.

T. D. Hatfield.

Begonia manicata.—This free-growing variety is useful either as a decorative plant or for winter flowering. In summer it may be used for grouping, either with the Rex varieties or as a substitute for them. The foliage is of a pleasing bright green; the plants are vigorous and healthy with an ordinary amount of care. A partially shaded situation is preferable, as the foliage then becomes a darker green, but the plants will stand the sun's rays without hurt if necessary. On being removed indoors, before danger of frost, water should be given rather sparingly, and this will help to somewhat ripen the stems and induce the plants to flower more freely. The branching cymes of pink flowers are useful for cutting, and make a graceful appearance in a vase. Stems from twelve to fourteen inches in length are readily obtained from healthy plants. Ordinary greenhouse treatment, with a night temperature of about fifty degrees, is the most suitable; if the plants are kept much warmer than this the flowers will not open so freely nor last so long. Too frequent potting and large shifts are not advisable, as the plants grow more compact in shape when the roots are somewhat confined. We have some good healthy specimens now in ten-inch pots which measure two feet through, but smaller plants are as a rule more serviceable. Propagation is easily accomplished by cuttings or by division, rooted portions of the stem being readily obtained.

Anthericum vittatum.—The superiority of this newer form over the old variety, *A. variegatum*, is so marked that it will undoubtedly supersede the latter in the near future. It is, as the name denotes, striped longitudinally as the old form is, but differs in being much brighter in the markings. A broad band of creamy white traverses the centre of the entire leaf, which is margined with an irregular band of bright green streaks of the green, sometimes running in through the white. In short, it may be said to be white where the old form is green and green where the old form is white. It possesses all the good standing qualities of the older form; the habit is more compact and growth somewhat slower. It is very serviceable

as a dwarf decorative plant, and especially valuable as an edging for groups; the drooping habit of the under leaves enabling it to entirely hide the pots in which the plants are grown. Division is probably the easiest and best method of propagation. The plants thrive well in light, moderately rich soil and with ordinary greenhouse treatment. It is of a rapid rooting nature and quickly becomes pot-bound, and should be kept liberally supplied with water.

Tarrytown, N. Y.

William Scott.

Cannas.—As soon as the first frost disfigures the foliage of Cannas we lift the roots and lay them to ripen in large clumps, without covering, in pits secure from frost. When Chrysanthemums are gone we divide and repot the Canna roots. In a good, light greenhouse, with a minimum of fifty-eight degrees, they soon start and give from the end of January onward a grand show of bloom. No plants are more effective for winter decorations. The flowers are larger and not so liable to blemish. Very little water is given until some growth is made, but when well rooted the plants will take an abundance of water, and also be benefited by liquid-manure at least once a week. Our plants increase in size and make fine specimens by the time they are required for the summer display. If rested for a fortnight or so in May they soon start into growth when planted out, and bloom with scarcely any intermission the whole year. Madame Crozy, Florence Vaughan, Charles Henderson, Paul Bruant, Helen Gould and J. D. Cabos make a fine selection.

Wintering Bananas.—We have specimens of *Musa ensata* now ten years old. Every season they have been planted in a conspicuous place near the mansion, and have grown into bold plants from ten to fifteen feet high. If planted out it is impossible to get any roots when they are taken up for the winter. We store them as if they were bulbs. A friend had a plant given him bundled up with moss in bagging, and it remained in this condition in a warm loft all winter quite forgotten. The following May the plant was discovered growing toward the light and was again planted out for the summer. It made good growth and this treatment has been continued. We place our plants in dry soil, and about the end of February put them in half flour barrels and start them enough to make a fair showing at planting time.

Wellesley, Mass.

T. D. Hatfield.

Correspondence.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—In planting trees and shrubs for autumnal effects it is well to pay some attention to the fact that all do not attain the greatest beauty and brilliancy of foliage at the same time. The landscape takes on a very different aspect in each of the three fall months. The brilliant Sour Gums, for instance, change from burnished green to rich deep red early in the fall, and are usually denuded of foliage early in October. Walnuts drop their leaves in September, hereabout, while Hickories retain theirs a month later. In late October all the Ashes, Gums, Walnuts and Sugar Maples in this vicinity are stripped bare of foliage. Thus, if one were to plant no other trees than these around his house, his grounds would take on their winter aspect very early in the autumn after a few days of passing splendor. On the contrary, home grounds in which Birches, Beeches and Oaks abound, would be much later in succumbing to the frosts of fall.

A neighbor of mine, living in a well-watered hollow, has many Willows of different varieties planted about his house. Here summer abides long after it has fled from the surrounding hills. Often the grass is green until covered by the snow, and the Willows, losing their foliage very late in the season, seem to shorten winter by burgeoning into their fresh young leafage long before the forest trees have awakened to a sense of spring.

There can be little doubt, however, that the most pleasing landscape effects are attained by grouping together a large variety of such trees and shrubs as naturally harmonize in color. We cannot do better than to go to the woods and copses to learn how Nature produces with her careless prodigality a rich and satisfying beauty at this season of the year. In many woods the most brilliant coloring is in the undergrowth, the Sumachs, Briers, Dogwood and Sassafras bushes forming a low belt of bright reds and orange and yellow hues, which, if carried higher, would dazzle, rather than charm, the eye. The larger trees of our woods, for the most part, take on soberer colors, which are accented here and there by the scar-

let of a vigorous Virginia Creeper swinging high in air. Thus the color-scheme tones with the lucid blue of the sunny October sky.

Now that the month nears its end the Sassafras and Sumachs are no longer brilliantly conspicuous, and the glowing red of the Virginia Creeper has faded from the landscape. The woods have lost much of their brightness, but the Dogwoods still hold their colors. Striking is the contrast between two large-flowering Dogwoods planted together at Rose Brake. Of these the Red-flowering Dogwood is now a brilliant claret-color, while the White-flowered form has assumed a much duller tint. A fine young Double-flowered Almond of the white variety now has foliage of a beautiful clear light salmon, while its neighbor, the common pink variety of the same plant, contrasts with it finely in a garb of green and lemon-yellow. To-day the most brilliantly tinted shrub, or small tree, in the home grounds is a Japanese Maple, which was green all summer and is now an intense blood-red, making a vivid spot of color on the grass. The red-leaved Japanese Maple, known to nurserymen as *Sanguineum*, on the contrary, has lost the rich uniform red which makes it conspicuous in June, and has assumed a harlequin costume of dull green mottled with orange, crimson and maroon. *Acer Tartaricum*, var. *Ginnala*, conspicuous for its Joseph's coat of many colors a week ago, has now lost all its finery and assumed its winter aspect.

A very handsome young Chinese Quince has rich red leathery foliage, retained sometimes until the last of November, and is effective now, standing out against a background of less brightly colored Peaches and Apricots. Much has been said about the fall beauty of *Spiraea prunifolia*, but a large bush of another *Spiraea*, sent to me under the name of *S. crataegifolia*, is even more brilliant in autumn dress. This plant is five feet in height and ten in circumference. Nothing can be more ornamental than its spreading growth and handsome foliage bright with harmonious blending of red and orange hues. Almost as brilliant in effect is Thunberg's Barberry, which will be a conspicuous ornament of the shrubberies all winter, when the bright leaves have fallen and the still brighter berries remain until flowering time comes round again.

Rose Brake, W. Va.

Danske Dandridge.

The Preservation of Fruits by Vapor of Alcohol.

To the Editor of GARDEN AND FOREST:

Sir,—This subject was brought to prominent notice by the experiments of Monsieur Petit, made at the National School of Horticulture at Versailles, France, in the fall and winter of 1894. A translation of Monsieur Petit's report was forwarded to this country by Mr. Henry P. Du Bellet, consul at Rheims, and was published in the *Consular Reports*, XLIX., No. 180, p. 24, September, 1895. An advance copy of this paper, extracted from the consular publications, was widely circulated among horticulturists in the United States by the Division of Pomology, United States Department of Agriculture. The method tested and favorably reported consists simply in the installation of the fruit in a moderately tight chamber or closet in which a small quantity of alcohol is exposed for evaporation. Monsieur Petit's successful experiments were upon grapes.

The report naturally aroused considerable interest in this country at the time, though little seems to have been done in actual demonstration. Professor Goff, of the Wisconsin Experiment Station, was the first, and, so far as I know, has been the only one to report any American experiments with this interesting method (*Wisconsin Experiment Station Reports*, 1895, p. 304). After making tests with several varieties of plums, Professor Goff concluded that "alcoholic vapor is an effectual preservative against the common mold or molds in a damp atmosphere; but the vapor did not prevent, except for a limited time, if at all, other changes within the fruits which destroyed their value."

During the summer and fall of 1896 we have made a large number of experiments with this method at the Vermont Experiment Station, in which we have used strawberries, raspberries, currants, peaches, apricots, cherries, plums and grapes. We have also used several forms of apparatus, so that we have been able to sound pretty thoroughly the practicabilities of fruit preservation by alcohol vapor. The details of these experiments or descriptions of apparatus would be wearisome, but a brief statement of our conclusions may be of value.

Thus, according to our experience, vapor of alcohol in a closed space will prevent more or less the growth of the fungi and bacteria which usually hasten decay. To be effective it

must be present in some appreciable quantity. In a tightly closed chamber of one yard cubical contents a half pint of alcohol in an open vessel will be sufficient. If alcohol vapor is present in comparatively larger quantities, the development of fungi and bacteria may be wholly prevented for several days, or even weeks. But in this case the fruits, especially those with soft flesh, absorb enough alcohol to affect the taste quite disagreeably. The fruit also deteriorates in color and texture. Although the growth of bacteria and fungi is stopped, other processes of decay seem to be hastened. With grapes alone the method seems to be practically successful. Grapes were kept for nearly two months at the temperature of a living-room and were still fit for table use, not being appreciably attacked by mold or affected in flavor. Not all the samples of grapes tested did so well, however.

We are inclined to believe from our observations up to the present that this method of preservation may very seldom be put to practical use, unless it be with grapes. With grapes there must still be considerable experimentation before the practical details can be satisfactorily worked out. With other fruits alcoholic vapor may be useful for comparatively short periods. Thus, berries or cherries might be placed in a tight refrigerator for a few days with an open vessel of alcohol and be preserved in better condition than without the alcohol.

Vermont Experiment Station.

F. A. Waugh.

The Rose, Bridesmaid.

To the Editor of GARDEN AND FOREST:

Sir,—In your issue for October 28th your London correspondent speaks of the "American Rose, Bridesmaid, as sent out by May." Perhaps it is worth stating that this sport of Catherine Mermet originated with Mr. F. L. Moore, of Chatham, New Jersey, and was first called Hugh. I afterward induced him to change the name to Bridesmaid.

Summit, N. J.

John N. May.

[We have a note to the same effect from Mr. Patrick O'Mara, who adds that it is interesting to know that Bridesmaid, which has now largely supplanted Catherine Mermet as a pink winter-flowering Rose, was received coldly by the trade at first. Perhaps this was because the Waban, also a pink sport from Catherine Mermet, which was issued a year before, was something of a disappointment.—Ed.]

Recent Publications.

Hand-List of Trees and Shrubs Grown in the Arboretum of the Royal Gardens, Kew. Part II. Gamopetalæ to Monocotyledons.

The first part of this useful list appeared two years ago and was noticed in these columns (see vol. viii., p. 9), and last spring a hand-list of the Conifers grown in the Royal Gardens appeared. The part now before us completes the list of woody plants grown at Kew, so that at last we have a complete *Arboretum Britannicum*, or rather a list of the species and varieties of the woody plants cultivated at Kew, with their synonyms and convenient references to published figures. Although his name does not appear on the title-page, this list has been prepared by Mr. George Nicholson, the accomplished curator of Kew, whose exact knowledge of the trees and shrubs of European gardens has in this way been made serviceable to all cultivators of these plants.

The last *Arboretum Britannicum* is that of Loudon, published in 1838. The completion of Mr. Nicholson's work enables us now to make some interesting comparisons between the number of plants cultivated at this time and sixty years ago. In 1838, when Loudon's *Arboretum* was published, the hardy ligneous plants cultivated in Great Britain were derived chiefly from Europe, Asia Minor and eastern North America; a few eastern Asiatic trees and shrubs were also found in gardens at that time. These had chiefly been sent from Japan by Dutch botanists who had found them in Japanese gardens, although French missionaries had sent the seeds of a few trees from China to Europe. In 1838 a few of the principal conifers of western America were cultivated in Great Britain from Douglas's collecting ten years before. These plants, however, at that

time were very small and little was known about them. Practically, therefore, all the trees and shrubs of western America, with few exceptions, have been introduced into Europe since Loudon's time; and since his time Hooker has botanized the high Himalayas and the forests of Sikkim, rich in magnificent species of Rhododendrons, now a chief ornament in many European gardens. Fortune, David and Henry have sent many plants to Europe from China; Von Siebold, Maximowicz and their successors have gleaned from Japan all its arborescent treasures; the Russians have made it possible for us to cultivate the trees and shrubs of central Asia and the valley of the Amur, and the Andes and New Zealand have been explored botanically. Since 1838, too, the hybridizer has been busy, and to his skill and perseverance we owe innumerable beautiful varieties of Rhododendrons, Azaleas, Roses and Lilacs. It is not, therefore, surprising that the number of the plants available for the decoration of the gardens and parks of temperate countries has increased enormously during the last half century. This, perhaps, will appear the more apparent by comparing the number of species in a few genera, selected at random, described in Loudon's *Arboretum*, with those in the present Kew lists. In *Lonicera*, Loudon included 29 species as cultivated in Great Britain in his time; Nicholson enumerates 53. In 1832, 32 Rhododendrons and Azaleas are described by Loudon, while in the Kew list we find 77; and in *Quercus* the number of cultivated species had increased from 45 to 76. These numbers are exclusive of varieties which have increased in about the same proportion as the species.

From the American point of view Mr. Nicholson's catalogue seems to leave something to be desired in the way of nomenclature; and it will serve as another example of the disadvantage of a system which is not based upon some fixed principle or rule. In view of the attitude of English botanists in general toward the American attempt to obtain stability of nomenclature we should have expected that the names adopted in this catalogue would have been those adopted in the *Kew Index*, which has only been completed a few months, the two publications having been prepared in the same establishment. But, taking our American Oaks as an example, we find the name of *Quercus bicolor* retained for our Swamp White Oak, and *Quercus cinerea* for the Blue Jack of the south Atlantic and Gulf coast, these being the names found in the *Index*. On the other hand, *Quercus falcata*, the name adopted in the *Kew Index* for the Spanish Oak, is discarded, while *Quercus cuneata* is adopted, the oldest name of this species being really *Quercus digitata*. *Quercus ilicifolia* is retained as the name of the little Bear Oak, and *Quercus Kelloggii* for the California Black Oak, while *Quercus Marylandica* of Muenchhausen and Sargent's *Silva* replaces *Quercus nigra* of Wangenheim, the name adopted by the *Kew Index* for the Black Jack, while *Quercus aquatica* of Walter, adopted in the *Kew Index* as the name of the Water Oak, is replaced by *Quercus nigra* of Linnæus. *Quercus stellata* is kept up as the name of the Post Oak, but *Quercus velutina* is adopted as the name for the Black Oak, although *Quercus discolor* is the name used in the *Kew Index*. Valuable as this work undoubtedly is to all cultivators of woody plants, we cannot but believe that if one of two principles had been rigidly adhered to in the selection of names it would have been even more valuable than it is now.

Notes.

The Ginkgo-tree is to be commended for its many good qualities, and among these must be mentioned the uniform clear light lemon-yellow color of its leaves in autumn. Standing in the full sunshine of an October day one of these trees is fairly luminous, as if shining with its own light.

The large apple crop in the United States has made unusual demands on barrel factories, some of which in apple-growing districts are unable to meet the orders of farmers of the neighborhood. Cold-storage houses have also profited through the

same crop, and the best establishments hold any remaining space at a premium.

Among the shrubs which delight us with their brilliant colors in the autumn, the Japanese *Evonymus alatus* is distinguished for the clear rose-pink of its leaves, which is unlike that shown by any other woody plant. Its fruit is less brilliant than that of our native Wahoo or of the European Spindle-tree, both of which belong to this genus. But the autumn color of the leaves of the Japanese plant is quite unique. It is a perfectly hardy shrub, too, of a compact habit and in every way desirable.

At one of the farmers' institutes in southern California, last summer, Mr. L. H. Cammack advocated the cultivation in that section of some semi-tropical fruits that are not very well known. Among these was the Avocado, or Alligator Pear, the fruit of *Persea gratissima*, which ripens as far north as Berkeley. There are red, purple and green varieties in cultivation, and many trees are growing thriftily in California. In Florida it is said a tree will yield a thousand pounds of fruit annually and begin to bear at the age of five years. It may interest persons who have it in mind to plant these trees to know that the fruit is steadily growing in popularity in this city, and, inasmuch as it can be picked a little before it is ripe, it carries fairly well.

A beautiful autumn bouquet can be made with fruiting branches of the different deciduous-leaved Hollies, the so-called Black Alders. In Japan one of the favorite house decorations at this season of the year is branches of *Ilex Sieboldii*, which are sold in the streets of Tokio and other cities in enormous quantities. Our American species bear, however, larger and showier fruit and are more decorative. The most beautiful of these plants is *I. lævigata*, although it is much less common than *I. verticillata*, a familiar inhabitant of northern swamp-borders. Of this plant there is a form with bright yellow fruit which is cultivated successfully in the Arnold Arboretum, where also the Japanese species flourishes, and this year is completely covered with its small, brilliant fruit. A vase containing branches of *Ilex lævigata*, the scarlet and yellow fruited forms of *I. verticillata* and of *I. Sieboldii*, gathered in the Arboretum, produces an effect which cannot easily be surpassed at this season of the year.

Nearly 100,000 barrels of Jamaica oranges have found a market in this city since the beginning of the season, whereas but 58,351 barrels came during the same period a year ago. The cost for freight, duty and other expenses is about \$1.25 a barrel, and at present prices there is little money made in the handling of this fruit, since \$2.50 a barrel has been the price in Kingston. Mexican oranges are at a still greater disadvantage, transportation costing about \$3.00 a box. During the summer season 3,935 car-loads of fruits have been shipped from California. This includes what is known in the trade as "deciduous fruits," as distinguished from citrus fruits, and the season for which is nearly ended. Twenty car-loads of California grapes were sold here last week, comprising Cornichon, Flame Tokay, White Muscat, Black Ferrera, Verdel and Emperor. The last direct shipment of this year's crop of Almeria grapes is said to be on the way to this country. This cargo, together with those already received, amounts to 134,470 barrels, or 19,465 in excess of last year's importations, while in 1894, 249,375 barrels were received.

Miss Alice Eastwood, the botanical curator of the California Academy of Natural Sciences, has issued in separate form two botanical papers published in the Proceedings of the California Academy. The first is devoted to descriptions of some new California plants, and is enriched with seven plates from drawings made by the author. The plants here described are a *Sedum*, an *Anemone*, a *Hosackia*, a *Lupine*, a *Heuchera*, a *Brodiaea* and a *Cynoglossum*. Miss Eastwood's second paper is a report on a collection of plants made by her in San Juan County, in south-eastern Utah, during a journey in the summer of 1895 through the valley and over the plateaus of the San Juan River, near the McElmo Creek junction, to where Willow Creek joins the San Juan. In this hurried journey, made on horseback in eight days, 162 species were collected. The fruit of the beautiful *Berberis Fremontii*, one of the most interesting and characteristic shrubs of the Colorado plateau, Miss Eastwood describes as rose-color near the pedicels, yellowish above and dehiscent into two spreading valves. The fruit was first described as blue. As this species grows in northern Arizona in the neighborhood of the Colorado River, it is certainly bright blue when fully ripe. *Fraxinus anomala* was common throughout the region, growing on the edge of

cañons and in the depths below. The range of this interesting tree, as usually published, must be extended into northern Arizona, where it is abundant on the upper slopes of the Cañon of the Colorado. Junipers, which are the most conspicuous feature of the vegetation of most of the Colorado plateau, were curiously absent in this particular region of southern Utah, only occasional trees of *Juniperus monosperma* having been seen by Miss Eastwood near the heads of the cañons that form branches of the San Juan. Here the trees were low and scraggy and generally solitary. The common Juniper of this region, *Juniperus Utahensis*, which is extremely abundant on the plateaus of western Colorado, through the high valleys of the Great Basin and in northern Arizona, was not observed by Miss Eastwood.

Last year the Legislature of the State of Maryland enacted a law making it the duty of the State Entomologist to inspect all the nurseries in the state for the detection of injurious insects or plant diseases which might be disseminated by selling the stock. Under this act, whenever a pest or disease is discovered the owner is notified and remedies are suggested. If he does not apply the remedies in the time specified, he is liable to a fine of \$1.00 for every tree or shrub or plant shipped from his nursery. The Entomologist can enter the premises in such a case, employ such assistance as he needs, and apply remedies for the destruction of the pest at the expense of the owners. In case the stock is free from infection the owner is furnished with a certificate to that effect, and he is required to send on every package shipped, as well as to transmit to the purchaser by mail, a certificate signed by him that the stock has been examined by the State Entomologist and that it is free from danger. Another section of the law provides for a certificate to be affixed to every package of nursery stock which comes into the state of Maryland from another state, showing that the contents have been examined by an authorized officer and are free from insects and diseases. If this act has not been complied with the packages are returned to the shipper, unless the consignee of the stock has it examined by the State Entomologist, who shall give the necessary certificate. In a bulletin lately issued from the State Experiment Station by the Entomologist it is stated that the nurseries of Maryland have been inspected and are, on the whole, in fine condition. The San José scale has been located in only three nurseries and has been in every case destroyed. No single case of yellows on marketable stock was found. The Pear slug was found in several cases, but these insects are so easily killed by hellebore that it is gross negligence on the part of any nurseryman to allow his stock to be dwarfed by it. Mr. Johnson, the entomologist, has had the active assistance of nurserymen in this campaign, and there is little doubt that if the same energy was exercised in all the other states these enemies of orchards and gardens would soon be under control so far as their distribution through nursery stock is concerned. This bulletin contains valuable information concerning the Peach yellows, the San José scale, and an account of a new disease of the Peach, of which no fungus or bacterial affection so far known can be identified as the cause.

The death is announced of Dr. Henry Tremen, at Peradeniya, in the island of Ceylon, on the 16th October, in his fifty-third year. He was educated for the medical profession and received a medical degree from the University at London, and became an assistant in the Botanical Department of the British Museum. With the present director of the Royal Gardens at Kew he prepared a Flora of the County of Middlesex in England, and with Professor Bentley a standard work on Medical Botany. In 1882 Dr. Tremen was appointed director of the Royal Botanic Gardens at Peradeniya, one of the most important and beautiful of all tropical gardens. In this position he devoted himself to a complete Flora of Ceylon, three parts having appeared. A few months ago ill health compelled him to sever his official connection with the Garden.

Auguste Trécul, the distinguished French plant anatomist, died in his seventy-sixth year, after a long retirement from active scientific work. His principal papers relate to the development and relations of the vascular system in plants and to the mode of growth of stems and roots. He is best known to Americans, perhaps, by his travels and botanical discoveries in the states west of the Mississippi River, especially in Texas, where he was sent in 1848 by the French Government to collect material for the Paris Museum and to study the textile plants used by the Indians of the Plains, and where he remained during three years. The beautiful arborescent *Yucca* of the lower Rio Grande valley, first introduced by him into European gardens, bears his name.

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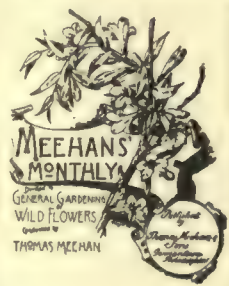
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Variety Tests in the Experiment Stations.

WE have more than once expressed the opinion that the work of our experiment stations in testing different varieties of fruits or vegetables is largely wasted. We do not mean by this that such tests have no value, but we feel that the trained investigators who have been organized in every state can use their time and talents to better advantage in establishing broad principles as the basis of farm and garden practice than they can in busying themselves with questions of such simple and elementary character that the farmers and gardeners can work them out without the aid of experts. One reason for the existence of experiment stations is that there are many problems which can only be successfully attacked by men of wide scientific knowledge who have been trained to accurate habits of research and generalization. Such investigations are costly, for the experiments often require expensive material and instruments which only educated men can use to advantage, and many of them need to be conducted through a long series of years before trustworthy results can be reached. This work is not only outside of the capacity of the individual farmer, but of farmers' clubs and horticultural societies. There is more than enough of this kind of research to absorb all the energy of the station workers, and it is a loss to the farming community when the limited number of skilled experimenters are taken away from these studies which they alone are able to prosecute successfully, and which are of such paramount importance. Any one can plant a dozen different varieties of Peas and keep a record of the dates on which they ripen, so as to find which is the earliest; any one can weigh the product of a dozen varieties of Strawberries and see which one is the most productive and which one has the longest bearing season. Perhaps in new states where there are unknown climatic conditions, with no experience in raising crops either in farm or garden to fall back upon, it is worth while for the stations to begin in this primary way. But when the bright young experimenters in our various stations grow old in the service and look back on the work of their lives they will hardly be satisfied if this has been confined or largely devoted to testing tomatoes.

Of course, we are assuming that these tests of varieties are trustworthy. But, in fact, with many fruits and vegetables the results in one place are not true for another. But even when these are carried out in a systematic manner, with uniformity of conditions, so far as soil, seed, etc., are concerned, the experimenter confronts the fact that the weather is quite outside of his control. Now, it often happens that a particular season not only affects the general yield of the apple crop, for example, but it affects different sorts in a different way, and, therefore, a test which does not cover a long series of years under similar conditions is of little use. In a recent number of the *Experiment Station Record* this fact is brought out in a very clear way. It is there stated that the test of varieties of Wheat or Corn, which covers only one or two seasons, does not prove with any certainty the relative adaptability of the varieties tested, even to a particular locality. This adaptability must be based on the average climate of the place, and such an average can only be secured by taking a number of consecutive seasons into account. The Illinois station not long ago published certain data regarding the tests with varieties of Corn during eight years, which make this point clear. Nine varieties were tried continuously, and a table in which the varieties are ranked according to the yield of shelled corn shows that the two varieties which stood lowest on the list the first year occupied the third and fourth place respectively when an average of the whole period was taken. The variety Leaming stands No. 1 on the list for the eight years taken together, and yet one year it stood near the bottom. One year Riley's Favorite and Golden Beauty ranked respectively first and second, but in the total average they stand last. Now, if we look over the records of the different stations where varieties of grains, fruits and vegetables have been largely tested, we will observe that these are not planted and tried every year, but disappear and reappear in the trials for different years without any apparent reason. This means that, even for the particular plot of ground in which it is tried in this fashion, we have no way of forming an accurate idea of the qualities of a given variety for an average season, while the results give no information whatever as to the adaptability of the variety to another section in any season.

These Illinois Wheat tests show one thing, and that is that the comparative behavior of different varieties for one season is no criterion for their probable relative behavior in the same place another year. This is a fact worth knowing, but it has been so thoroughly demonstrated that there is little need of proving it over again, and on the whole it is our opinion that the results of these tests are not worth what they cost. The experiment stations have established a great many truths in regard to dairy practice, to the feeding of animals for various purposes, to the methods of checking insect ravages and plant diseases, and in these and other ways they have already paid for themselves over and over again, but we do not recall any single benefit to cultivators that has come from even the most carefully conducted experiment with varieties of fruits or vegetables. We should be very grateful if some station director would point out definite instances in which work in this direction has proved of any great value. When we consider the time and money that have been spent in this way the present and prospective results ought to have some importance. Certainly, if the views in *The Record* are correct the methods ought to be changed, and it is a question worth discussing whether the practice should not be abandoned altogether.

THE value of commission experts in our cities, to whose decision artistic and æsthetic matters can be referred, has lately been demonstrated in Boston by the refusal of the Art Commission of that city to allow an inappropriate statue to be placed in the court-yard of the Public Library. It seems possible that the functions of such commissions can be usefully extended over a wider and more important

field. If it is desirable to keep bad statues and other so-called works of art out of our cities and to prevent the erection of good ones in inappropriate places, it is certainly more important to prevent the erection of ugly and inconvenient public buildings such as school-houses, court-houses and public libraries, and ugly and badly constructed bridges and other structures paid for by the public. The town of Brookline, in Massachusetts, at least believes that it is feasible to improve the appearance and character of her public buildings by the use of artistic advisers, and by a by-law recently adopted by the town and approved by the court, it becomes the duty of the selectmen to appoint a committee to whom the plans of all public buildings and other structures paid for by the citizens are to be submitted for approval or rejection. This plan seems to be a real step forward in artistic progress, and the results of the experiment made by this small community will be watched with interest everywhere.

SINCE the dry weather in early spring there has been abundant moisture in this vicinity all summer through, and the grass in lawns and pastures never grew more sturdily; nevertheless, we have rarely seen so many bare spaces in the turf of our city parks or suburban lawns as there have been during the present autumn. There may be many causes for this. It is certain that the Crab-grass has been unusually aggressive, and so have certain annual grasses and weeds, and after they have died down and turned black the natural conclusion is that they have killed the lawn grasses and left the ground bare. But it is clear that the trouble in many cases is deeper than this. There are places where the brown sod can be rolled up like a carpet and the dead grass can be pulled out by the handful, like the hair from an animal when it is shedding its coat. This indicates that some enemy has destroyed the roots of the grass, a devastation largely accomplished by cut-worms of several kinds and the larvæ of different insects. After these insects destroy the good grass, some annual grass, like *Panicum sanguinale*, takes hold, but the damage is done before the foul grass intrudes. One who watches these bare patches may now and then see a flicker boring into the ground, and in some cases these birds have been driven away as the supposed destroyers of the grass. Their presence, however, proves that the real enemies are certain grubs upon which they feed. The difficulty is not an easy one to remedy, and it is so serious that we have asked Professor Smith, Entomologist of the New Jersey Experiment Station, to give some account of the enemies which prey upon lawns and pastures, and the first part of his paper appears on another page of this issue. The article was not prepared for specialists, but it is written in such a way that every reader will be able to identify these pests and know how to apply the remedies so far as any effective ones have been devised.

Conifers on the Grounds of the Kansas Agricultural College.—II.

THE White Pine, *Pinus Strobus*, has not, on the whole, proved a success. While it is unquestionably the most beautiful of the Pines that have been tried here, and while it will often grow well for a number of years, it does not seem able to endure the vicissitudes of the Kansas climate, and eventually dies. The oldest specimens on the College grounds at present are eleven trees on the south side of the lower farm. The soil is here a clay loam of about twelve inches in depth, underlaid by a reddish clay subsoil. These trees were sent here in 1886, being then about four years old. At present they seem to be in a vigorous condition, and during the season of 1896 have made a growth from the terminal shoot of from 16 to 30 inches. They give the following average measurement: Height, 16½ feet; diameter at the ground, 6 inches; at 2 feet, 4½ inches, and at 6 feet, 3 inches. The largest tree

in the group measures 22½ feet high, with a diameter at the ground of 8 inches, and at 2 feet of 6½ inches. In the yard of a private house just east of the College grounds stands the oldest White Pine in this vicinity. Professor Mason says of it in a paper read in 1888: "A White Pine in Professor Gale's grounds, planted in 1875, and now apparently seventeen or eighteen years old, is 26 feet high, 9 inches in diameter at the ground, and 6 inches at 6 feet. It is perfectly straight, and the handsomest tree of all that I have measured." At present this tree gives the following measurements: "Height, 32½ feet; diameter at the ground, 13½ inches; at 2 feet, 11 inches, and at 6 feet, 9 inches, an increase in seven years of 6½ feet in height, and 4½ inches in diameter at the ground. But the top is dead, and the whole tree shows evidence of decline. The death of some of the White Pines on the College grounds might be attributed to unfavorable location, but this one is as favorably situated as it could possibly be.

The Table Mountain Pine, *Pinus pungens*, is perfectly hardy here, and for ornamental planting on a large tract, where a striking, picturesque effect is desired, it is not to be surpassed, but it would seem to be too crooked to be valuable as timber trees, and its growth is slow as compared with the Scotch and Austrian Pines.

The Dwarf Pine, *Pinus pumilis*, has been planted in considerable numbers for ornamental purposes, and is certainly admirable for that use where a low-growing evergreen is desired. It is perfectly hardy and grows very slowly. Two specimens in front of Horticultural Hall are now, as nearly as can be ascertained, nineteen years old, and measure 8 feet in height, with a spread of 12 feet. It is a tree which not only grows on very poor soil, but is very easily transplanted. The Pitch Pine, *P. rigida*, is also perfectly hardy and forms a good straight trunk, but it grows too slowly to be profitable here.

Agricultural College, Manhattan, Kan.

R. C. Sears.

Notes on a Trip to the Dismal Swamp.

THE large tract of inundated lowland in south-eastern Virginia known as the Dismal Swamp possesses an interest to workers in all branches of science from the fact that it is the first or most northern great series of coastal swamps extending from Norfolk southward for many miles. To the botanist such an area furnishes valuable opportunities for the study of geographical distribution and of habitat, and mainly with this object in view I made the expedition to the swamp last May in company with a geologist and two ornithologists. The accompanying notes on the flora of the region are the outcome of only two days' sojourn in the swamp itself.

In many parts of the area under consideration the term "dismal" is a misnomer, as the trees are not of sufficient size and density to exclude the sunlight altogether, or even to give that appearance of gloom afforded by the coniferous forests of the north. In the interior, however, especially around Lake Drummond, certain trees, such as *Acer rubrum*, *Nyssa biflora*, etc., attain a very great height. The majority of the remaining trees, like *Magnolia glauca* and *Quercus nigra*, do not exceed, for the most part, twenty or thirty feet. The last two species, in company with several ericaceous shrubs and the Hollies, *Ilex glabra* and *I. opaca*, when intertwined with the numerous woody vines that abound in the swamp, constitute an impenetrable jungle which defies even superficial investigation unless exploring botanists are armed with bush knives. While paddling up the Jericho Canal from Suffolk in a dug-out we noted several well-marked areas in which some one of these dominant species seemed to flourish at the expense of the others. Along the side of the canal for the first few miles, soil thrown out in the construction of the ditch forms a moderately firm bank, along which is a good towpath. Here the Cane grows rather sparsely, but there are numerous trees apparently not found in the interior, notably *Aralia spinosa*, *Sassafras*

Sassafras, *Rhus copallina* and several Oaks. A few introduced weeds, including the ubiquitous English Daisy, are scattered along the bank.

A few miles farther we notice a gradual subsidence of the embankment, the soil becomes more moist and the Cane grows in dense brakes, overarched the canal and effectively smothering the smaller herbaceous vegetation. Soon the water of the surrounding swamp is seen to merge with that of the ditch, and the Cane, finding no anchorage for its tough, ligneous root-stocks, disappears almost completely, its place being taken by masses of *Woodwardia*, which grow in from one to two feet of water, and whose fronds attain enormous dimensions. Around the roots of shrubs a quantity of *Sphagnum* lodges, mingled with decaying sticks and herbage, thus affording conditions favorable to the growth of such plants as *Pogonia ophioglossoides*, *Limodorum tuberosum*, *Mitchella repens*, *Impatiens*, and even *Gaultheria procumbens*, the flavor of the winterberries borne by the latter being fully equal to that of specimens from a mountain woodland farther north.

As one nears the end of the canal, shrubs and trees become thicker, and the Cane is again abundant. *Smilax laurifolia* and *S. rotundifolia* festoon the lower branches of the trees, while the Supplejack, *Berchemia*, the Fox Grape and the Cross Vine, *Bignonia capreolata*, strive for the possession of the lofty trunks. Fallen logs float on the surface of the water and become converted into veritable moss gardens, among which *Polypodium polypodioides* thrives.

The Bald Cypress, *Taxodium distichum*, is apparently less abundant in the swamp than formerly, and of the specimens observed by our party the majority were young. Lake Drummond is full of Cypress-stumps, indicating that a large number of these trees once grew within its area. The peculiarity exhibited by this species of forming enlarged butts, or elbows, often in connected series, is observable to less extent in most of the arborescent vegetation. The knees attain greater proportions in the Cypress, however, and seem to be designed to obviate rapid decay and to anchor the plant firmly in the depth of water that it prefers.

Lake Drummond, a sheet several miles in diameter, is the centering point of the various canals and ditches penetrating the swamp. Apparently its waters nowhere exceed ten feet in depth, except during the period of overflow in the spring. Around its margins lie, perhaps, the most densely wooded portions of the swamp, and innumerable stumps and tree-trunks, still standing erect in the water, tell the tale of a forest that once covered much of the present surface of the lake.

Several interesting additions to the flora of the Dismal Swamp have been detected of late. Dr. Britton and Mr. Hollick found *Andromeda nitida* during an autumn trip to the swamp several years ago. Within the last two seasons Dr. A. K. Fisher has collected *Ilex lucida*, and I have found *Clematis crispa* in considerable quantity. It is very certain that a well-equipped botanical expedition would find much of interest in the still unexplored parts of this peculiar region.

Washington, D. C.

Charles Louis Pollard.

Entomological.

Lawn and Grass Infesting Insects.—I.

LAND cultivated in one kind of crop for many years successively tends to attract all the different kinds of insects that feed upon it. In some localities where Onions were grown in times past with excellent results, the Onion maggots now make it impossible to raise a crop. In many parts of New York state Wheat culture was for a time abandoned, because of the ravages of the Hessian fly. In parts of the central west it has become impossible to grow Corn more than two years in succession on the same ground, because of the abundance of insects that get into it after that time. Farmers have long known that after land has been in pasture for a few years, or has been mowed, the grass "runs out." They accept this fact and act upon it without much question-

ing as to just what this running out consists of; but in many cases the land has become so thoroughly infested with grass-feeding insects that the roots are no longer able to support a growth. Insects are not confined to farms or farm-lands; they occur wherever plants are grown in cities and villages, and are troublesome in the back yard, in the kitchen-garden, to the shade-trees, and even to the little patch of lawn in front of the house. The more extensive the lawn and, in a general way, the better kept it is, the more attractive it becomes to insects.

Insects of almost all orders are found in grass lands, and as there are few grass plots in which there is not also some clover, insects infesting this plant are also more or less abundant. It would be of little avail to list the dozens of species that we may find in such places; but it will be useful to know something of the few that are most abundantly met with, and that do most injury.

In the order Lepidoptera we find among the moths a series of little species known as Crambids (see figure 60), many



Fig. 60. *Crambus vulvivagellus*: *a*, the larva or root web-worm; *b*, a silken tube above ground; *c*, same beneath the surface; *d*, moth with wings expanded; *e*, wing of a variety; *f*, moth at rest; *g*, egg, very much enlarged.—From Div. Ent., U. S. Dept. Agt.

of which live in the larval stage on grass, either at the surface or just below it, feeding upon the roots or cutting off the stalks just at the level of the ground. Many of these caterpillars spin silken tubes above or below ground in which they rest, and from which they travel in search of food—never to any very great distance, since they always make their home where roots are most abundant or the grass plants most dense. The caterpillars, like all insects living more or less concealed, are yellowish or whitish in color, sometimes with a grayish tinge, always more or less set with bristly hair; with a brown or blackish head, and with the first segment behind the head armed with a brown shield. They live and feed during most of the summer and make their appearance in the moth state from midsummer on, producing a second brood of caterpillars which emerge as moths in spring. These moths are slender-bodied creatures, rarely more than half an inch in length, with narrow fore wings, yellowish or brown in color, sometimes mottled or streaked with golden and silver bands or lines. The hind wings are always broader, but are folded up so closely that they can be covered by the primaries, which in turn are so closely applied to the body that the insect, when at rest, looks like a little rolled-up cylinder, easily overlooked when resting on a blade of grass or on the paling of a fence. The head is quite prominent and is furnished with a pair of long palpi which resemble somewhat a snout, giving the creature, when at rest, rather a saucy appearance. These moths lay their eggs either upon the blades or stalks of grasses, or drop them loosely upon the ground; the young larva in any case making its way to the best feeding-place as soon as it is hatched. The egg itself, while very minute, is also very pretty, longitudinally ribbed, and the spaces between the ribs divided by impressed lines, so that it may be rather fancifully compared to a chubby ear of Indian corn. The caterpillars themselves are known as root web-worms, and where they are abundant in grass land they cause the death of patches here and there. It is evidence of their presence when little tufts of grass die in places without obvious cause, the spots increasing in size for a time, then remaining and perhaps recovering to some extent after midsummer; while late in the season other places show a similar appearance. If a tuft of grass or a small sod, from a spot just turning brown, be removed, and the earth shaken carefully from the roots, these caterpillars will be found in their silken tubes, while cut or

girdled roots or stalks show how the injury has been accomplished. In some cases we may find the caterpillar inside the stalk of grass, or even boring in a rather large root or crown.

In the order Coleoptera we have several species that are troublesome on lawns and in grass land. First among them, perhaps, may be considered the wire-worms. The term "wire-worm" is popularly used to designate two very different kinds of creatures, both of which may be found in grass land, but which have entirely different habits and life histories. One form of wire-worm is brown or blackish, from an inch to two inches in length, almost cylindrical, with many segments, two pairs of legs on each segment, and a habit of curling up when disturbed. This is one of the myriapods (see fig. 61), and



Fig. 61. A "wire-worm" belonging to the Myriapoda, *Julus coeruleocinctus*.

these insects are very apt to be present where the land is very rich, where there is much vegetable matter in the soil, and where barnyard manure is frequently and heavily applied. They are always associated with decay, and while they do some injury on living plants, yet their usual food is dead and decaying vegetable matter, including the dying roots of the grass plants. Frequently they bite into soft, juicy tissue, and sometimes induce a decay of which they afterward take advantage.

The other kind of wire-worm is yellow in color, also a slender but somewhat flattened creature, with only six legs at the anterior part of the body, and not often exceeding an inch in length. It does not coil up when disturbed. This is the larva of one of the click-beetles, or Elateridæ (see fig. 62), and is exceedingly destructive. It feeds on living-plant tissue and almost entirely upon the roots of plants. The life-period is a variable one, but is rarely less than two, and more frequently



Fig. 62. A wire-worm. Larva of an Elaterid, or click-beetle.—After Kiley.

three, years, giving the individual insect a greater power for mischief than is usual, while it can readily be seen that from year to year the number of specimens must increase, as insects of different stages are found at the roots constantly. A lawn badly infested by these insects will show a poor appearance over the entire surface. There will hardly be distinct brown patches as with the preceding insects, but there will be a general poverty-stricken appearance over the entire surface, and the grass will get thin and feeble, the result of the feeding of numerous larvæ among the roots. When these creatures become full-grown, which is usually at or after midsummer of the last year of their larval life, they form a little cell in the ground just beneath the root mass, and there change to a pupa and soon after to a beetle, which, however, does not become fully matured until the spring following. The beetles make their appearance in May or June, sometimes even in April if the season is an early one, and there are a number of different species involved.

Click-beetles (see figs. 63 and 64), or Elateridæ, are easily distinguished by their power of leaping or jerking themselves upward placed upon their back. There is a peculiar structure on the under side of the thoracic segments, by means of which the insect is enabled to throw or snap itself into the air, and from this it has received its names, click-beetle and snapping-



Fig. 64. Click-beetle, from side with legs removed, to show the prosternal apine.

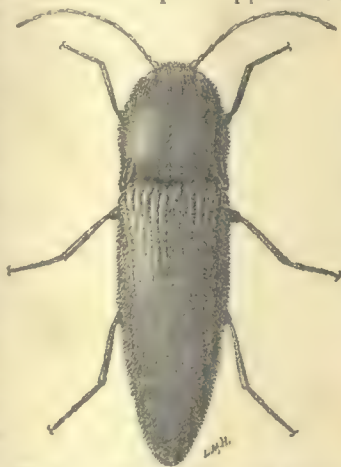


Fig. 63. A common click beetle, *Melanotus communis*—From Forbes' Ill. Repts.

beetle. The eggs are laid before July, as a rule, in the soil in which the future larva is to find its food-supply.

J. B. Smith.

New or Little-known Plants.

Aster infirmus.

OF the three North American Asters belonging to the section *Doellingeria* characterized by a manifestly double pappus with clavellate thickening of some of the bristles of the inner series, and which was formerly included in the genus *Diplopappus*, the most familiar is *A. umbellatus*, a tall plant with dense corymbs of white-rayed flowers, conspicuous in our swamps late in summer and autumn. Less well known is *A. infirmus*,* though described by Gronovius in 1739 and figured by Plukenet as early as 1720. This figure apparently remains the only one published, with the exception of that in Willdenow's *Hortus Berolinensis* (as *A. humilis*), a work not generally accessible. For this reason it is hoped that our figure on page 465, made from a wild specimen growing in Lincoln, Massachusetts, where it was found in abundance this season, may prove of interest.

Aster infirmus is very distinctly marked by its slender zigzag stem, scattered, entire ovate or obovate leaves, ciliate on the margin, and loosely corymbose heads with few broad white rays. It ranges from Georgia and Tennessee to eastern Massachusetts where it is a rare and local plant.

The third species of the section, *A. reticulatus*, of the Pine-barrens of South Carolina and Florida, we shall hope to figure at some future time.

Arnold Arboretum.

C. E. F.

Cultural Department.

Bud Variation of the Concord Grape.

VARIATION in the Concord Grape has been noticed for a number of years. In the Bushberg Catalogue mention is made of a mammoth Concord that appeared twenty-five years ago. "This," the catalogue says, "has now proven to be identical with the Eaton, or, at least, if not the same Grape and of the same origin, it is so much like the Eaton in all characteristics, habits of growth, foliage, fruit, time of ripening and quality that the two Grapes cannot be distinguished. As our neighbor could tell us nothing about the origin of his Grape, but claimed simply to have received it among a lot of Concords, we have never disseminated it nor offered it for sale."

Since my attention was called to these mammoth Concords, I find, on inquiring among vineyardists and others, that they have been noticed from time to time in many localities, but usually no explanation is given for their appearance. On a recent visit to the vineyard of Mr. Walter F. Taber, of Poughkeepsie, New York, the proprietor pointed out to me one of these abnormal vines, which is certainly the result of bud variation. Mr. Taber trains his vines on the two-arm Kniffen system, renewing them from near the ground as soon as they show the need of it. The renewing is accomplished by allowing a suitable bud to grow that is situated as near the ground as possible. When the new vine has attained sufficient size, the old one is cut out and the new one is put in its place. In this manner the vine is renewed without seriously interfering with the continuous yield of fruit. The vine in question was planted in a Concord vineyard and bore Concord fruit up till the time that it was renewed. The new bud grew more vigorously than the surrounding vines, and when it came into bearing it produced not Concord grapes, but black grapes that are much larger in both bunch and berry. The quality of the fruit is inferior to that of the Concord, the pulp being watery, rather acid and flat to the taste. The skin is tender and cracks easily.

Across the river at Middle Hope, Mr. W. D. Barns has a vine that produces fruit that is nearly identical with that of the one just mentioned. This vine was received by the owner in a lot of Concord plants, and has always produced the same kind of fruit. The bunches are very large, while the berries are characterized by their large size, tender skin, watery, acid pulp and insipid taste. Mr. Barns told me of another instance where one vine that was purchased with a lot of Concords produced fruit similar to the one in his vineyard. This occurred in the vineyard of Mrs. Rose, of Marlboro, New York. The owner propagated from the vine, and now has a small vineyard of the variety which is known under the local name of Jumbo.

* Michaux, *Fl. Bor. Am.*, vol. ii., 109.



Fig. 65.—*Aster infirmus*.—See page 464.

Samples of these grapes were received from Mr. Taber and Mr. Barns, and when shown to prominent vineyardists they at once pronounced them to be the Eaton. Now, it is possible, but hardly probable, that a single vine of the Eaton may have

been sent out in different orders of Concords from a number of nurseries. But, since Mr. Taber's vine is a bud variety, and, no doubt, there are others that could be proven to be, it seems more likely that all of these abnormally large Concords are the

results of bud variation. From the great similarity of these grapes to the Eaton we are led to question whether or not the latter is not of the same origin.

These examples form an apt illustration of the well-known facts that in many cases varieties that are practically identical have originated almost simultaneously in widely separated localities, and that fruits that are new to the originator are constantly being introduced that closely resemble standard varieties. It would seem, then, in justice to the originator of new fruits, that one should be familiar with the origin of a variety that has been introduced as new before pronouncing it to be an old sort renamed.

Experiment Station, Geneva, N. Y.

W. Paddock.

Carnation Notes.

THE Indian summer weather of the last few days of October and first week in November has quite transformed the plants in our benches. All are now promising with buds, and the general stock never looked better at this season. The long spell of dark, damp weather during September and October was specially favorable for the spread of fungoid diseases on Carnations, and in looking over the houses of several large growers recently I noticed rust on the foliage of several varieties. So badly, indeed, have some sorts been affected that it has been necessary to throw the plants away. Della Fox, last spring's introduction, which was thought likely to supersede the ever-popular Daybreak, is more badly diseased than any other variety, and no one appears to have clean stock of it. Introducers of new varieties ought to be honest enough to state whether any kinds they are sending out have had rust. Some growers do this, but others do not. We do not believe any Carnation can be classed as rust-proof. It may be so in one place and not in a neighboring establishment. I have seen rust on all the leading sorts, with the exception of William Scott and Mrs. Fisher, but even these have this disease thirty miles from here. At present Della Fox is the only kind we grow on which rust has appeared. We syringe our plants with Fowler's Solution of Arsenic, dissolved in water at the rate of one ounce of the solution to six gallons of water, once in four or five days. A stronger application does not injure the plants, but we find that wetting every plant thoroughly with a solution of this strength kills any rust which has appeared on the leaves. This remedy cannot be claimed as a preventive, nor can any other solution thus far tried, but we believe that a persistent use of it will greatly minimize the evils so many growers are regretting. It is well to look over plants carefully once or twice a week and pick off any affected leaves which may be seen. Careful ventilating and watering, cleanliness and proper atmospheric conditions count for much in the successful cultivation of Carnations, and there is less chance of rust and other fungoid diseases getting a foothold where such details are well attended to. Jubilee, one of Mr. Hill's new varieties, was badly rusted with us in September. At present it is perfectly clean and making capital growth. We have grown it apart from all other varieties, as the introducer stated that it took rust. We hope now to carry our plants through the dull winter months free from disease and have clean stock to propagate from for another year.

Our plants were staked, tied up loosely and cleaned of all decaying foliage during October. They require looking over occasionally to have ties readjusted. At present we keep our plants cool and airy for the benefit of some benches of Chrysanthemums in the same house. When these are all cut we try to give the Carnations a night temperature as near fifty degrees as possible, preferring to have it a few degrees lower rather than higher on cold nights. During bright sunny weather, such as we now have, the benches require an average of two good waterings in a week. The water should run through the bottom of the benches. After tying our plants we scattered a light dressing of well-pulverized rotted manure and wood ashes over the surface soil. Many roots which were running along the top of the soil are now feeding on this covering, and its benefit to the plants is apparent. No liquid stimulants have yet been given, but about the middle of November we will commence to give the soil a light scattering of some chemical fertilizer once a fortnight, and a moderately weak dose of liquid cow-manure occasionally. We have been holding a number of plants in a frame until Chrysanthemums can be taken out of the house, when we will put fresh compost in the benches and plant them there. This is a convenient method where bench room is limited. The plants start to grow at once and become well established in a surprisingly short time. We have had only light frosts in this section until

now, and a bed of summer-flowering varieties outdoors are still blooming profusely on November 3d.

Abundance, one of E. G. Hill's introductions, seems to be well named. With us it is proving a persistent bloomer, both outdoors and inside. It is of a good salmon-pink color and quite a dwarf grower. It has good average-sized flowers, the calyx is very stout, and when this variety is better known it will be largely grown. Triumph, certificated at Boston in 1895, is a good bright pink color, the flowers are much larger than those of Abundance and produced on long, stout stems. This promises to be a useful sort. Nicholson, which we still grow a few of, although it has been generally discarded, gives very large flowers at this season, but is not a satisfactory winter bloomer here. William Scott easily distances all competitors in its particular shade of pink and is the only kind grown to any large extent in both private and commercial places. Bridesmaid, which we are trying a second year, gives at this season some beautiful, large, clear pink flowers. It did not prove a prolific bloomer last season, however. Possibly stronger plants propagated earlier may tend to improve it next winter. Daybreak among "shell" pinks is quite badly affected with rust this year in some places. It is still largely grown and popular. We do not think Della Fox has any chance of competing with it for precedence in this class. Eldorado is proving our best yellow so far; the flowers are large and stems and calyx all that could be desired. We are trying Buttercup once more, but it will not give more than an occasional flower before spring. Goldfinch we still think highly of; it is not equal to Eldorado in size and general excellence, but proves a reliable color which is still but poorly represented. Armazindy, in the variegated class, is an acquisition. The flowers are quite large, produced on stiff stems, color pure white, lightly penciled with scarlet. We consider this superior to Helen Keller. We have not grown Minnie Cook, but patches of it which we have recently seen bear out the favorable opinion of it formed a year ago. Hector we still prefer to any other scarlet, but we grow a few plants of Portia. A good scarlet is much needed, and we hope Jubilee may fill this need. A variety as vigorous as Portia, with larger flowers, is needed. Lizzie McGowan still easily takes the lead among several good white varieties and is doing better than ever before. So-called improvements on this most popular of all white varieties do not seem to make much headway in public favor. With us it proves a constant bloomer from the time it is placed in the benches until the following September. Some varieties may have larger individual flowers, others may give larger crops at times and better-formed blooms, but for all-round excellence we prefer Lizzie McGowan to Alaska, which is probably its strongest competitor. F. Mangold continues to be the leading crimson in this district. Meteor did unsatisfactorily last year; at present it is yielding some fine flowers of a very brilliant crimson-scarlet color. The flowers are larger than those of F. Mangold, but have a tendency to come semidouble, or even single. If well grown it is undoubtedly the finest crimson we have. It did not produce sufficient flowers last year to make us think highly of it, but a second year's trial with more vigorous plants may improve our opinion of it.

Taunton, Mass.

W. N. Craig.

Garden Notes.

I HAVE found the season of 1896 a very unsatisfactory one for Gladioli. Seedlings flowering for the first time have done very well, appearing to have greater strength than the older sorts. Even G. Branchleyensis seemed to find the struggle against adverse circumstances almost too much for it, while such sorts as Didon, Shakespeare and Norma gave not a single flower. The Lemoinei varieties were little better as a whole, while the Nanceianus kinds were exceedingly unsatisfactory. As for the Childsi strain, if I were to judge it by this year's results I should simply throw it away. I bought in the spring a number of named varieties of most alluring descriptions, but they proved a most disappointing lot. I hope that another year they may prove valuable, but I have never seen reason to rate the strain very highly. I tried some of them a few years ago and discarded them for their inferiority. They have Saundersi for one parent and Gandavensis for the other, and certainly cannot approach in beauty the Nanceianus kinds which are raised from Saundersi and Lemoinei. I found the bulblets of Nanceianus very slow to start when planted out; of several hundred "spawn" of C. Horace de Choiseul planted this spring only four or five grew. The Lemoinei seedlings seem to grow more and more like the Gandavensis varieties; I found several among my plants this year which puzzled me; I

could not tell which series they belonged to and solved the problem by pulling them up so that they should belong to neither. The best Lemoinei kind I have ever seen I flowered this year, having just purchased it from Monsieur Lemoinei; its name is Domino Rose. It is an immense rose and white flower, larger, I think, than any Nanceianus kind I have seen.

Victor Lemoinei's bluish kinds (he abstains from calling them blue) are Lemoinei hybrids, and are all very striking and very good. I prefer the two called *Senateur Volland* and *Firmament*. It is curious to observe that when the time comes the same sport will occur in widely separated places. For example, some years ago a Dahlia came up in the spring in my garden. It was one of a row of seedlings and in some way was overlooked when the rest were lifted, and was covered so deeply that the winter did not kill it. That spring I imported and flowered the fine kind, *Mrs. Gladstone*; it was absolutely identical with my seedling. Single Cactus Dahlias appeared among my seedlings the very year they began to be noticed in England, and this year I had a blue *Gladiolus*, of as decided a color as any of Lemoinei's, raised from seed planted before I had even seen one of his varieties. *Gladioli* have done as poorly everywhere in my neighborhood as with me, but Mr. J. W. Clark, of Millis, about fifteen miles away, made as good a showing at Horticultural Hall on prize day as ever. One of his spikes was the best I ever saw or heard of, as far as length of spike is concerned; it had twenty-two flowers, all fully opened and all perfect.

My stock is all lifted at last, though some of the bulbs were in the ground at least two weeks too late. All ought to be out of it by the twentieth of October, for when the ground gets cold, especially if there should be much rain, the bulbs begin to rot, the largest going first. When we leave bulbs in the ground to try whether they will be hardy if covered, we generally find that they do not come up in the spring, the fact being that they were dead and rotten before winter began.

I will add a note which will be an addition to our very meagre knowledge as to the vitality of flower seeds. Nine years ago I gave a gentleman some Dahlia seeds. He planted a part of them and put the rest into a dated paper bag. To-day he has told me that he planted the remainder this spring, and that to the best of his belief not one failed to grow.

Canton, Mass.

W. E. Endicott.

Indoor Work.

WORK under glass is now chiefly of a routine character, but even this is not without interest, for each successive season gives a better understanding of the peculiarities and requirements of the plants. It took several years' experience to show that *Lapageria rosea* does not need a stove temperature, and, in fact, will not flourish under this condition, and that *Odontoglossums* do not need coddling in a warm house. The private gardener should keep up a good stock of flowering plants for cutting, and also for conservatory and house decoration. While *Chrysanthemums* will continue to occupy a prominent place for a few weeks, other plants must be borne in mind, and among these *Roses* are important. Cleanliness must always be observed in the Rose-house, and the more we learn of fungoid diseases and insects the greater the necessity appears for absolute cleanliness. Staking and tying should be done in the neatest possible manner, and all decayed leaves, weeds and rubbish promptly removed. Carnations need similar attention, a support of some kind being required by nearly all the varieties. If large flowers are desired, disbudding must be practiced to some extent, and abundant light and ventilation, in accordance with the weather, are essential. The matter of temperature for Carnation-growing has been much agitated of late years, and, doubtless, some varieties give better results in a comparatively high temperature. But in a general way it may be stated that the flowers produced in a temperature of fifty degrees are usually of a much more lasting character than those grown at fifty-eight to sixty degrees, the latter extreme being the practice of some growers. Bulbs for forcing should be planted in pots, pans or flats according to the use to which they are to be put, this operation being done just as soon as possible after the bulbs are received. The best place for their storage after planting is a cold frame or pit. Lily-of-the-valley of this season's crop is not satisfactory for very early forcing, on account of the tendency to produce flowers without much foliage; but after New Year the foliage and flowers will develop together with proper treatment.

A pleasant indication of advance toward a greater variety of winter-flowering plants is noted in the offering of several varieties and species of *Ericas* among the stock of the florists' shops, as mentioned in a recent issue of GARDEN AND FOREST,

and these same species should find a more extended use among private growers. Among the best of the *Heaths* for this purpose are *Erica hyemalis*, *E. Wilmoreaana*, *E. persoluta* in its various forms and *E. hybrida*, all of which are reasonably easy to manage and very free-flowering. Cuttings of the *Heaths* rooted during the latter part of winter or early in spring, potted on as they need it, and later in the season plunged outdoors in coal ashes, will usually make a substantial, well-ripened growth and flower freely the following winter or spring. The *Boronias* and *Chorozemas* are also valuable flowering plants for the greenhouse, and easily grown under much the same conditions as *Ericas*. A few pot-grown evergreens—for example, *Retinospora plumosa aurea*, *Cryptomeria Japonica* and *R. leptoclada*—are often useful for the decoration of a dark hall or other unfavorable location for plants. A few cuttings may now be put in for this purpose. If a sufficiently cool place cannot be had in the greenhouse, the cuttings should be put in a cold frame, moderately shaded and protected from severe frost, and they will be nicely rooted by spring if properly cared for.

Holmesburg, Pa.

W. H. Taplin.

Autumn Snowdrops.

IN spite of the mild days lately prevailing, the earth has become so cold as to check floral growth, and, except a few odd belated blooms, there are no other seasonable flowers in the borders than the Snowdrops. While we are accustomed to associate the Snowdrops with the opening of the floral season, the Grecian forms of *Galanthus nivalis*, *Olga* and *Octobrensis* as naturally mark the close of the year. Of these forms the first-named is the earlier, and usually appears in September, to be followed by the latter, as its name indicates. Under the prevailing low temperature their blooming period is prolonged, and they still ornament the border. They both have the light-colored stripe down the midrib of the leaves, which is a characteristic of all autumnal Snowdrops yet found. This stripe is formed by the exposure of the interior spongy cells of that portion of the leaf, and, like the analogous coloring in the *Cyclamen*-leaf, is not a variegation as usually understood. The leaves of *Alga* are broader than those of *Octobrensis*, and the bulbs and flowers rather superior in size, but they are both very good forms of the ordinary *G. nivalis*. The autumnal Snowdrops were long very rare plants, and all the examples of *Octobrensis* in cultivation were for a number of years the progeny of a single bulb found by an English Ambassador. If such a plant "grows wild somewhere," some enthusiast may be expected to find its haunts, no matter how obscure, and lately Max Leichtlin, and perhaps others, have made the Albanian Snowdrops comparatively plentiful. In this prosaic age there are still people who are not absorbed in financial questions and who will go to great lengths to collect a few plants and incidentally add to the happiness of mankind. Only the other day a friend sent me a few seeds of a rare plant, a fair share of the result of a private expedition of many miles into the southern Peloponessus, the treasure-trove giving him more happiness than many brokerages.

Elizabeth, N. J.

J. N. Gerard.

Correspondence.

Apple-twig Blight.

To the Editor of GARDEN AND FOREST:

Sir,—In examining the trees in the experimental Apple orchard here with the object of removing all parts affected with twig or fire blight, *Micrococcus amylovorus*, it is interesting to note the wide difference in the extent to which different varieties are affected. Some will be almost, or entirely, free from it, while others will be so badly affected that in order not to leave any of the diseased parts it is necessary to remove almost the whole top of the tree, and this in spite of the fact that twice during the earlier part of the season all affected parts were carefully removed.

Among the sixty varieties in the orchard those most severely attacked are *Lowell*, *Cooper's Early White*, *Isham Sweet*, *Smith's Cider* and *Yellow Transparent*, while among those showing little, if any, damage are *Celestia*, *Buckingham*, *Mammoth*, *Black Twig*, *White Winter Pearmain*, *Winesap* and *Ben Davis*. The last-named variety is, perhaps, as nearly exempt from the disease as any other sort. Trees of this variety are scattered throughout the orchard in close proximity to badly affected sorts and in all the different soils which the orchard affords, and which are quite variable, yet nowhere is it seriously affected, and usually not at all. Whether one variety

will be exempt in all localities, or whether the same variety will be free in one place and attacked in another, remains to be seen, but, from my own observations, I judge that the former is largely the case. If it should prove so, and if the disease should continue as prevalent in future as it has been during the past season, the comparative susceptibility of different varieties will certainly have a strong influence in determining their popularity among those planting orchards in the future.

Geneva, N. Y.

F. C. Sears.

Exhibitions.

Chrysanthemums in Philadelphia.

THE old building of the Pennsylvania Horticultural Society, destroyed by fire three years ago, is now more than replaced by a new fire-proof structure with all conveniences, and here the annual exhibition of the society was held during last week. Built in the style of the Italian Renaissance, the interior, as the outside, is characterized by restraint and dignity. While the main charm of the building is in the form and proportions, the decorations and coloring are likewise harmonious and artistic. The new Horticultural Hall is a credit to the society and to the city. The space occupied is ninety by two hundred feet, the front being of Pompeian brick, with three arched doorways, above which are windows of stained glass, where the sea-green prevails, which recurs in the interior decorations. Beyond the spacious vestibule a grand stairway of Tennessee marble divides to right and left above and leads to a spacious landing and corridors, where the arches are supported by columns and pilasters in green. The main exhibition room, to the west, is seventy by one hundred feet. The ceiling, thirty-five feet above, is one of the most satisfying features of this beautiful room; the walls are decorated in a warm pinkish tint, gold and sage-green showing in the designs and figures. The room is well lighted on two sides. Above the platform at the west end are three arched recesses with balconies.

In this hall were the Chrysanthemum plants, extending in broad lines throughout its length and across the front, besides a deep row set below the platform. The centre of the room was occupied by two large circular groups of Orchids and Crotons, and the side walls were pleasingly lined with masses of Chrysanthemums and of foliage plants. A screen of yellow flowering Chrysanthemums and Palms extended across the front of the platform, and ended effectively at each corner in standard plants eight feet high, crowned with immense blooms. The arrangement was admirably simple, the dependence for effect being entirely upon the plants and flowers on exhibition, and the beautiful building.

Among first-prize plants were those of the white Mrs. McK. Twombly, shown by G. Wilbur Brown, gardener to George B. Roberts, Esq., Bala, Pennsylvania; an excellent specimen of George W. Childs, from the same grower; Seedling No. 4, a well-grown plant of this new yellow Chrysanthemum, from John McCleary, gardener to William Weightman, Esq., Germantown, this being a new variety not disseminated before 1896; a plant of the variety Mrs. Frank Thompson, grown by Gordon Smirl, gardener to Joseph F. Sinnott, Esq., of Rosemont, Virginia; and in the class of a seedling plant, best variety, in not over fourteen-inch pot, a good pink seedling from the same grower. In the group of five plants, five varieties, in not over fourteen-inch pots, single stems, were some of the best specimens in the show, including plants of Elmer D. Smith, an open flower, with petals rich deep red above and silvery beneath; Mutual Friend was the white in this class; in pink, Mrs. Jos. F. Sinnott and a tall luxuriant plant of Roslyn, while a plant of the yellow Georgianna Pitcher, five feet high and as much across, was one of the best, carrying nearly a hundred blooms. Alexander Kerr won second prize in this class with smaller but evenly grown compact plants of Major Bonaffon, Mrs. P. J. Walsh, Hicks Arnold—the only plant of this variety seen—Mrs. Paul, Jr., and Harry May. James McCleary won third prize with creditable plants, that of Georgianna Pitcher being specially good, and some of these plants were as large as any on exhibition. The class of three plants, three new varieties, introduced to commerce during 1895, included in the winning group the pink varieties William Simpson and Mrs. Jos. F. Sinnott, and a yellow seedling.

The plants of Chrysanthemums were distinctly better in vigor and size and in condition of the flowers than those shown last year, though the flowers lacked the extreme size and often the perfect form of those exhibited in Philadelphia previous to 1894. Not a few of the specimens reached five feet high from the edge of the pot, and bore in some instances, perhaps, as many flowers as those seen on the phenomenal

plants grown by James Verner in earlier years. But the outline of the plants was not symmetrical, and the flowers lacked uniformity in size. The principal prize-takers were Gordon Smirl; John McCleary; J. E. Krayner, gardener to W. B. Garrett; Alexander Kerr, gardener to Mrs. P. J. Walsh; C. W. Cox and Charles F. Evans.

The cut chrysanthemums were mainly staged in the arched corridors about the top of the grand staircase, and here the best opportunity was afforded to study varieties, many of the best sorts seen here not being represented among the plants. Among fifty blooms of fifty distinct varieties Frank Thompson was a good pink, W. Seward a good deep red, and other excellent flowers were Silver Cloud, Pluto and Maud Dean, originated eight years ago by Robert Craig, and one of the best varieties in the exhibition. A group of fifty blooms, not over four of a kind, comprised some of the best flowers in the entire show, and included perfect specimens of Eugene Dailledouze, Golden Wedding, the pink U. Bloodgood, the fine-petaled Iora, the globular white Mrs. U. Starin, and again Silver Cloud and Maud Dean. Among twenty-five blooms, twenty-five varieties, were notable flowers of the terra-cotta and gold Pluto, Louis Boehmer, and Modesto, similar to Eugene Dailledouze, but more golden. Flowers of Maud Dean, the largest seen in the exhibition, won first premiums as the best vase of twenty-five pink blooms, and a new pink seedling, Colonel Thomas Potter, of pleasing color and fair size, won second premium for Hugh Graham. The winner among white kinds in a similar class was Mayflower, and in yellow, Golden Wedding. Philadelphia, the startling novelty in 1894, was creditably shown by Hugh Graham and Samuel J. Bunting, to whom prizes were awarded. A striking vase of the deep golden yellow, Mrs. Louise D. Black, won first prize for Mr. Robert Craig, and Joseph Heacock and J. E. Krayner won silver cups with flowers of William Simpson. Mrs. Colonel Goodman, a variety which won a national certificate for commercial use, was shown by Mr. Charles A. Knapp, the flowers white, globular, of medium size. A collection of several hundred first-class flowers, not entered for competition, from John Cullen, gardener to Percival Roberts, won a special prize. Katherine Leech, Sunrise, Intercean and Charles Davis were notable in this group. Joseph Heacock, Wyncote, Pennsylvania, won a number of first prizes for cut flowers.

A large and handsome collection of Crotons, many of the specimens being new varieties and distinct improvements on well-known sorts, won first premiums for Robert Craig. The varied display of Orchids from Hugh Graham included rare and new flowers, and won first premium. Among these were the fragrant *Zygopetalum Mackayii*, *Lycaste aromatica* and *Odontoglossum ornithoricum*; a white variety of *Dendrobium Phalaenopsis*, *Oncidium varicosum Rogersii*, the graceful *Vanda cerulea*, *Cypripedium Dibun* and *Odontoglossum coredina*.

The supper-room contained only Ferns and other foliage-plants of medium size, and the monotone of green was admirably set off by the warm terra-cotta colored walls. A specially interesting display of Ferns from the establishment of Henry A. Dreer included sorts of easy cultivation for the house, many of them varieties of *Pteris*, plain and crested.

One of the most effective exhibitions was a tank of Water-lilies containing a great variety of those suitable for winter flowering, from William Tricker, of Henry A. Dreer. Besides the flowers of *Nymphaeas*, there were many other choice water-plants, with Bamboos and decorative marsh-plants. Other displays on the first floor were of coniferous plants from the W. H. Moon Company, dwarfed Japanese evergreens from Henry A. Dreer, and roses, carnations, violets, pansies, fruits and vegetables.

The classes for this year's exhibition have been considerably changed, the premiums, exclusive of fruits and vegetables, amounting to \$2,773.50. The exhibition throughout was pleasing and creditable, although it lacked any striking advance in new varieties or improved cultivation.

Chrysanthemums in Boston.

IN comparing the flower show held in Boston last week with previous autumn exhibitions of the Massachusetts Horticultural Society, the first impression was that the Chrysanthemum blooms have reached their limit as to size, and if any further improvement is to be made it must be in form, substance and color. It may be said also that there were fewer poor blooms than ever before, and therefore the cut flowers, taken together, were the best ever seen here. There were half a dozen competitors in the class for groups of Chrysanthemums mixed with foliage plants, and these together

made a striking effect and added much to the general good appearance of the show. As usual in Boston, there was great interest in the competition for twelve specimen plants. This year Nathaniel T. Kidder (William Martin, gardener) again took the first prize; Walter Hunnewell (T. D. Hatfield, gardener) took the second prize, and Mrs. B. P. Cheney (William Barr, gardener) took the third. Even the collection which was graded the lowest was very creditable, and consisted of a neat lot of small plants perfectly and evenly flowered. The twelve plants in this list were Zulinda (pink), Mrs. Robert Craig (white), Mrs. Bishop (pale yellow), Primula (straw color), W. H. Lincoln (yellow), Gold Dust (yellow), Sunrise (bronze), Mutual Friend (white), a pink form of Ivory, Columbine (bronze), Georgiana Bramhall (bright yellow). It ought to be said that Mrs. Cheney sent many other specimen plants which competed in other classes and which were good enough for any company. Mr. Kidder's group was of very uniform size, with admirable foliage and in the pink of condition as to bloom. His list of plants included Minerva (yellow), Louis Boehmer (pink), Golden Hair (yellow), Theo (French white), Edwin Lonsdale (deep pink), W. H. Lincoln (yellow), Iora, an admirable individual plant, although the flowers were somewhat bleached in color; Joseph H. White (cream color), Columbine (bronze), John Shrimpton (crimson), Clinton Chaffant (yellow). Walter Hunnewell's collection included a greater variety of types than either of the others. The colors were unexcelled and the plants were noticeably large; in fact, they were too large. Plants six feet through do not allow of such a perfect massing of color as smaller ones. It is a question whether a specimen plant, trained with very few stakes, is not more graceful than plants like those in the winning class which were brought by more staking into exact form; but certainly the rigid plants when massed together made a more attractive show. Mr. Hunnewell's plants were Gaza, with a striking white Anemone-shaped flower; C. H. Curtis, Chinese incurved; S. T. Murdock, reflexed Japanese pink; Joseph H. White; G. W. Childs, with large, deep-colored flowers, but a coarse plant; Clinton Chaffant, deep yellow; Columbine, incurved Japanese, deep bronze; Kitty Sanders, scarlet and old gold, a most beautiful combination of color; Cullingfordii, crimson; W. H. Lincoln, a mound of yellow without stakes and six feet in diameter; Louis Boehmer; G. Daniels, white, tinted with pink. Mrs. Cheney filled nearly one side of the hall with specimen plants and took prizes in almost all the other classes, and a more even and well-grown lot has rarely been seen. For other collections the chief prizes were taken by S. J. Trespass, James L. Little, Dr. C. G. Weld, Walter Hunnewell and N. T. Kidder.

Of the massed groups of Chrysanthemums, Palms and other foliage-plants, Mrs. A. W. Blake, of Brookline, took the first prize, Dr. C. G. Weld the second, J. W. Howard the third, E. S. Converse the fourth, and James Comley the fifth. Of course, the large vases filled with cut flowers were once more a great feature of the show, and John Simpkins (William Brydon, gardener), as usual, swept almost everything he competed for. The vase of Mrs. Jerome Jones (white) was superb, and his vase of mixed flowers, including Philadelphia, Vivand Morel, Mayflower, Golden Wedding, Mrs. Rand and one or two others, has rarely been equaled. The vase of mixed blooms offered by Mrs. Cheney contained H. W. Reiman, a magnificent yellow; Helen Bloodgood, an extra-fine pink; Maud Dean, Mrs. G. West, Shenandoah, red, and E. M. Bigelow, crimson. Mr. Brydon's exhibit for twenty-five blooms contained splendid flowers of Modesto (yellow), Mrs. Rand (yellow), Therese Rey (white), E. Molyneux (crimson and old gold), Niveum (white), John Shrimpton (crimson), Florence Pullman, a noble specimen of Golden Wedding, E. Dailedouze, R. McInnes, H. W. Reiman, Mrs. Jerome Jones, Gladys Spaulding and Major Bonaffon. Among the single flowers shown by Mrs. Cheney, Ruth Ellis, with white strap-shaped petals, was unique; Rinaldo, a handsome wine-color, and G. A. Magee, an incurved pink, were both worthy of mention. E. M. Wood, of Natick, had noteworthy vases of Molyneux, Mrs. Jones, Intercean and Golden Wedding.

For the best seedling not yet disseminated, J. Eaton, Jr., received the prize for six pink blooms, and the prize for the best white-flowered seedling went to the same grower. Charles Sander was first with a seedling of any other color, and Joseph H. White for Li Hung Chang, the best incurved variety of any color.

Of course, in an autumn show Chrysanthemums have the chief interest, but a bank of Adiantum Farleyense grown by Mr. Barr was worth notice for its admirable cultivation, and so was a vase of the new hybrid Tea Rose, Souvenir du Président Carnot, which was sent by Mr. Asmus, of New York,

and was awarded a silver medal as a gratuity. François Supiot, of West Philadelphia, showed a set of new single Violets, every one of which marked a distinct advance over the old Russian single variety, which was exhibited for comparison. Dr. Weld deserved the honorable mention he received for plants of the variety Major of Browallia speciosa, which were admirably grown and have much larger and more beautiful flowers than those of the type.

Some complaint was made by visitors of the delay in attaching award cards to the plants. It was late on the second day of the show before it was learned with certainty who had taken the prizes in the cut flowers, and it would seem that when a charge is made for admission visitors have a right to know whose plants they are admiring.

Recent Publications.

L'Hortus Boissierianus. Par Eugène Autran & Théophile Durand. Genève et Bâle: Georg & Cie. Pp. 772, with portrait and two figures.

Edmund Boissier, the distinguished author of the *Voyage Botanique dans le midi de l'Espagne* and of the *Flora Orientalis*, was an ardent and successful cultivator of plants, having established at his country place of Valleyres, at the foot of the Jural Mountains, a garden which became famous all over Europe. Boissier's numerous journeys in the Orient, Italy and Spain, and his excursions into the Swiss Alps, gave him opportunities to gather roots and seeds of many alpine plants for which the garden at Valleyres was specially noted. From his knowledge of the conditions under which these plants flourish naturally he was able to devise successful methods for their cultivation, and in this Swiss garden were seen in perfect condition many plants which had defied the care of less successful cultivators.

Valleyres was Boissier's summer home. In the winter he lived on the shores of Lake Lemman, where he had established a great arboretum, into which he had introduced many exotic trees, principally conifers. This arboretum, which is now the property of Monsieur Barbey, the son-in-law of Boissier, has become one of the most beautiful and important pinetums in Europe. Boissier died in 1885, and his son-in-law has now had prepared, under the title given above, a catalogue of the plants cultivated by the Swiss botanist in his two gardens at the time of his death, that the world may be able to appreciate the extent and character of the work to which he had devoted so much study and labor. The catalogue, which gives a list of the species, with the date of their publication, references to the best figures representing them, their synonyms and geographical distribution, has been prepared by Eugène Autran, the keeper of the Boissier herbarium at Chambésy, near Geneva, and Théophile Durand, curator of the Botanic Garden at Brussels, the preface being supplied by Professor Crépin, director of the Brussels Botanic Garden.

Some idea of the richness of these collections appears in the fact that the number of species and varieties cultivated in the two gardens was more than 5,000. Genera and species of alpine and subalpine plants are wonderfully represented; for example, there are 27 species of Ranunculus, 20 of Arabis, 13 of Draba, 26 of Dianthus, 107 of Saxifrage, 42 of Campanula, 25 of Gentian and 76 of Iris. Liliaceae is represented by 30 species, Fritillaria by 35, Calochortus by 15, etc. No one unfamiliar with the preparation of a catalogue of this sort can form probably any idea of the amount of labor necessary to determine correctly 5,000 species of cultivated plants, to establish their synonyms, geographical distribution, and to indicate the best figures which have been published of them. The work is well done, and, as Monsieur Crépin points out in his preface, *L'Hortus Boissierianus*, by the exactness of its determinations, is a book which can be most advantageously consulted by botanists and collectors, and which should occupy an important place with the best general works on garden botany. In congratulating Monsieur Barbey on the publication of this work, Monsieur Crépin takes occasion to remind his readers that the son-in-law of Boissier has

enriched science with an establishment of the first class, the Museum Boissier-Barbey, in which are admirably housed the vast herbarium and the library collected by Boissier. The herbarium is growing steadily by purchase and by collections made in different parts of the world by travelers sent out by Monsieur Barbey for the purpose, while to the library are added all the new works of descriptive botany.

Notes.

The autumn hereabout has been unusually mild and open. Nasturtiums were blooming until they were chilled by the fall of temperature last Friday night, and plants of *Daphne Cneorum* are still opening their fragrant flowers as cheerfully as if it were May.

No one who has a Currant-bush needs to buy plants of a nurseryman if he wishes to increase his stock. All that is necessary is to take cuttings of the new wood before the ground freezes and set them rather deeply and about three inches apart firmly in the ground where they can remain for a year. Grapes and Gooseberries can be propagated in the same way.

An agricultural experiment station has been established at Usambara, in German East Africa, for the purpose of investigating the agricultural character of that region and discovering its adaptability to various crops. Both native and introduced tropical plants are now under test at different altitudes to decide which ones are best suited to cultivation, and when these points have been determined both the plants and seeds will be supplied in commercial quantities to settlers.

Tiny young onions are coming from New Orleans, and cost ten cents for a bunch of two dozen. Cultivated sorrel, from Long Island, sells for seven cents a quart; large, well-grown heads of cauliflower bring fifteen cents each, and Brussels sprouts fifteen cents a quart. Watercress is coming from Virginia, as are peas and string-beans. Florida is also sending the latter vegetables, with eggplants and cucumbers. There are at present no field tomatoes in market, and the hot-house product costs from forty to fifty cents a pound.

Fruits of the well-known Ground Cherry, *Physalis pubescens*, have recently been in considerable demand in our markets by persons who like their distinctive flavor, for preserves, twenty cents a quart being the price. Husk Tomato, Dwarf Cape Gooseberry and Strawberry Tomato are other familiar names for this plant, while paper-shell tomatoes is the local trade name for the small yellow fruits. Professor Bailey's experiments with species of *Physalis*, published in a bulletin several years ago, were referred to in GARDEN AND FOREST, vol. v., page 108.

Mr. William Falconer, who has successfully conducted the semi-monthly horticultural journal, *Gardening*, through a hundred issues, announces in the last number of that paper his resignation as editor. Mr. Falconer's reason for retiring is that his time is thoroughly occupied in preparing and carrying out plans for the improvement of the Pittsburg park system, of which he is superintendent. It will be a difficult matter for the proprietors of *Gardening* to find a successor with as wide a knowledge of plants and as varied an experience in all branches of horticulture as is possessed by Mr. Falconer.

At a recent meeting of the Biological Society of Washington, as reported in *Science*, Dr. Irving F. Smith described a bacterial disease of Potatoes, Tomatoes and Eggplants which is caused by a new micro-organism which he names bacillus solanaceum. Dr. Smith thinks this is the cause of a large part of what is called the potato-rot in the United States. The organism is probably transmitted from diseased to healthy plants by means of insects, and in the greenhouse under strictly controlled conditions successful infections have been obtained by means of the Colorado potato-beetle. A bulletin which gives an account of this parasite will soon be published by the Department of Agriculture, and its appearance will be looked for with interest.

Pomegranates, from Spain, as bright-colored as Baldwin apples, are seen in many of the best fruit-stores, and cost from fifty to seventy-five cents a dozen. The last Japanese persimmons of the season sell for forty to sixty cents a dozen. Jamaica grape-fruit of good quality may be had at eight to fifteen cents each, and selected oranges, from the same island, cost forty-five to sixty cents a dozen. Several hundred boxes of oranges, from Punta Gorda, Florida, brought \$4.50 a

box, wholesale, last week, when \$3.00 a box was an extreme price for Jamaica oranges. Concord, Catawba and Delaware grapes are still quite plentiful, and range from fifteen to twenty-five cents for a four-pound basket. Showy Lady-apples, small and of even size, bring twenty cents a quart; quinces, sixty-five cents a half-bushel; Crab-apples, seventy-five cents for the same quantity; and Seckel pears, from Boston, sell for twenty-five cents a quart.

In an article on the "Physiological Rôle of Water in Plants," by Professor Edmond Gain, of the University of Nancy, France, and published in the *Experiment Station Record*, among other practical applications of the subject, we are told that when a given soil produces vigorous plants whose transpiration is very active, and young plants whose organs are less developed, the roots of the first will take up the humidity of the soil with greater force than those of the second. If, therefore, the soil does not contain enough water for both, the weaker will suffer. This is the case with Clover seeded with Wheat which suffers in a dry spring, while Clover seeded alone makes a good growth. Farmers continue to sow their forage seed with cereals under the mistaken idea that the cereals are beneficial as a shade. If they would seed their forage plants alone they would not only secure a greater yield, but in dry countries would stand a better chance of producing a crop.

A good illustration of the fact that a variety of fruit may be valuable in one place and comparatively worthless in another is found in certain expert opinions gathered by *The Rural New Yorker* in relation to the Crosby Peach. So good an authority as Mr. J. H. Hale says that in Connecticut the Crosby has special value in the hardiness of its fruit-buds and its late blooming, which enables it to escape spring frosts better than others; that it is inclined to overbear, but that when thoroughly thinned the fruit is of medium to large size, and in 1895 the largest peach grown in Connecticut was one of this variety. Its flavor is better than that of any yellow peach he knows, and is the best keeper which he has shipped from Georgia. On the other hand, Mr. Charles Wright says that it is not as hardy in Delaware as many other varieties; that it is too small, even when thinned, to be of any value; that it ripens with Reeve's Favorite and Oldmixon, both of which bring better prices, and that therefore there is no place for it in the Peach orchards of the Peninsula.

The Michigan Agricultural College has issued a circular offering to young men and women who cannot spare the time and money for a long college course, special instruction in certain branches of agriculture for six weeks. One of these courses, devoted to fruit culture, embraces instruction in the propagation of plants by various methods, the care and management of orchards and kindred subjects; and another is devoted to floriculture and the forcing of winter vegetables. This last includes tuition in the construction and heating of greenhouses, the propagation of all the leading commercial plants, with lectures on botany, entomology and chemistry. Students will have the advantage of competent and enthusiastic teachers, the great college library, the forcing-houses and laboratories of the college, and the fee will only be \$2.50 to cover incidental expenses. Inasmuch as board can be had near the college for \$3.00 a week, an opportunity is offered for instruction at a nominal cost, and with such an environment as ought to give any young person an inspiration in his work and yield returns a hundredfold in every way.

The crown forests of Sweden comprise more than one-quarter of the entire wooded area of the country and are managed with scrupulous care. The increase alone is cut, so that a productive forest is to stand forever on all crown lands that are unsuitable for cultivation. More than this, the Government has entered upon an extensive system of planting trees on desolate and uncultivated areas, and these object-lessons have induced owners of private forests, especially the larger proprietors, to manage their timber lands so that they will become permanent sources of income. These facts were communicated to our Department of State by Hon. H. W. Thomas, United States Minister to Sweden, and they are of particular interest, not only to Sweden but also to the United States and to Canada, whose lumber meets the Swedish product as its greatest competitor in the markets of the world. Since the forests in Sweden grow slowly it has generally been supposed that the immense quantities exported would gradually exhaust this most important source of the nation's wealth, but from the facts stated it appears probable that the forty-seven million acres of forests in the country will continue to be a source of income for all future time. The products of the forest now comprise nearly one-half of the total exports of the country in value.

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Unnatural Colors in Foliage.

A CORRESPONDENT writes us that he was never so impressed with the beauties of our autumn foliage as he has been during the present year, and it occurs to him that if masses of gold and crimson leaves are beautiful in autumn they must be quite as beautiful at any other season. He adds, that in view of what nature can do and what nature actually does, our objection to trees with vivid foliage seems like an affectation of severe taste. To this it may be replied that we have no objection to *Negundos* with pale leaves, or to *Elders* with yellow ones, or to *Prunus Pissardi* with its so-called purple foliage, if such trees are kept in their proper place. Nature is a good guide in this as in other matters, and we do not see forest borders in which a large portion of the trees have streaked or spotted leaves or deep wine-colored ones like the Copper Beech. This does not mean that our woods and shrubberies are a monotone of vapid green. From the dark green of the Spruces and Pines to the light green of some of the Willows, the Lead-plant and the Buffalo-berries there is range of color enough to give an almost infinite variety, and yet there is nothing like what is called "striking color-effects" by some park-makers; nothing like the large masses of *Prunus Pissardi* which we sometimes see in private grounds about American villas, or nothing like the patches of pallor on the landscape that is so often produced in European parks by masses of white-leaved *Negundos*. Any one with a sense of appropriateness can feel the difference between a natural landscape which catches its tone, and, indeed, its highest charm, from the gray old Olive-trees on every hand, and an artificial park made up of sports such as nurserymen delight to call *Atropurpurea* and *Aureo-marginata*.

Of course, when we speak of a natural landscape as distinct from one in which the color-effects are in a sense artificial, we remember that nature is responsible for all these strong colors. Indeed, our correspondent's argument is based on the fact that at one season of the year our woods glow with tints that cannot be matched in splendor

by the odd colors of sports which have been preserved and propagated by gardeners. He might have added that our trees in early spring are almost as striking for their colors as they are in autumn. It is true, they range through a different scale, but the delicate pinks, soft grays and yellows of the opening year are quite as distinct and quite as beautiful as the crimson and gold of its close. But it must be remembered that in spring as well as in autumn these effects vary with every day and almost with every hour. There is that constant change which is the very life of beauty in the landscape. We do not object to a pattern-bed, for example, when the colors are harmoniously blended, because it is bright and striking, nor yet because it is formal, but primarily because it is invariable, and, therefore, in time becomes wearisome to the eye. A mass of scarlet *Alternanthera* and yellow *Coleus* on a lawn may have the same colors as the autumn forest leaves, but it glitters there day after day, from morning till night, in rigid sameness, without growth or development or change, the one stationary spot in all the picture, while all about it is constant transformation. Again, oddly-colored trees, especially if obtrusively planted, catch the eye at once and invite attention to themselves instead of mingling in with the general effect in the landscape. All summer long they stand to distract the mind from the beauty of the scenery with which they do not harmonize, and grow more and more tiresome with their monotonous appeal for special notice. A great part of the beauty of the foliage of trees in early spring is due to its evanescence, and a forest-covered hillside, which is glorious in the sunshine of an October day would become wearisome rather than impressive if it glowed with the same colors all summer through.

There ought to be no need of repeating that we never object to bright colors as such in the planting of parks or public grounds. There are few people who are not attracted by a mass of *Rhododendrons* in bloom, and certainly nothing can be brighter, but the flowers fade and fall before they become a weariness. In spring, when our wood borders are white with Dogwood or pink with the blossoms of the Judas-tree, they have a special charm which delights every beholder. But this is the beauty of a day. The planting in parks of shrubs which are covered with abundant flowers, like Japan Quinces and Forsythias and *Spiraeas*, is only to be commended. But it must be observed that in every case the flowers vanish so quickly that we have a feeling of sadness at losing them, and this makes their reappearance another year a delight for which we long. If they stared at us all summer long we would feel grateful to the frost which came to kill them. True, there are some shrubs and plants which flower all summer through, and delightful ones they are. On a good plant of *Clematis crispa*, for example, we can find some of its beautiful bell-shaped flowers every morning, but there are only a few of them, and they are never in sufficient abundance to make a conspicuous display. *Clematis paniculata*, on the other hand, which flowers but once, delights us with the abundance of its bloom, which quite hides the foliage and then disappears and leaves behind another form of beauty.

The sum of the whole matter is that the great floral displays which we appreciate are transitory, and we naturally provide for one to follow the other, so that no season will lack its special beauty of color. There are times when rich and striking color appeals to every eye, but we do not think that good taste will commend the perpetuation of every freak of nature or the multiplication of oddities of form or color. These have no real place in the quiet harmonies of the landscapes of our temperate climate. If they are used at all they should be introduced very cautiously to emphasize some point, and not in such abundance that they will make war upon the general landscape-effect of this region. Bright-hued and transitory flowers we have in abundance, but plants with variegated and highly colored leaves are very rare in our woods and fields. Therefore, not only to avoid sameness, but to preserve the essential quality of

our landscape, we ought to follow the broad principles, at least, which Nature plainly lays down.

JUDGE BELLINGER, in the United States Circuit Court at Portland, Oregon, has recently delivered an opinion in the case of the United States against the Tygh Valley Land and Live-stock Company which is of the utmost importance. The suit was brought by the United States to restrain the defendant from trespassing on the Cascade Forest Reserve by driving and pasturing sheep thereon. The effect of the decision is to declare the right of the Government to protect the forest reserves by civil process, a right which the sheep-men of Oregon have always denied. It has been argued that an implied license to pasture on the forest reserves had grown out of the custom which has existed from the beginning of the Government, by which the public lands have been used as pastures, especially those in which the native grasses are adapted to the growth and fattening of domestic animals. Judge Bellinger has ruled, however, that there is a clear distinction between public lands and lands that have been severed from the public domain and reserved from sale or other disposition under general laws, and that the reservation of these lands is their appropriation to a special public use, and is, therefore, a disposal of them so far as the public domain is concerned. "This appropriation," he declared, "is for the promotion of the public good. It is claimed for the Government that the pasturing of these lands with sheep will injuriously affect the forests of the reservation and thus tend to defeat the object for which the reservation was made. The object of the reservation is the preservation of the forests of the Cascade Range of mountains, in Oregon, and there is, therefore, no implication of a license to use the reserved lands for the destruction or injury of these forests. The Government, no less than a private party, is entitled to have its interests protected against the threatened trespass and injury."

Entomological.

Lawn and Grass Infesting Insects.—II.

PERHAPS the most common and destructive of the larvæ found in lawns are white grubs, the larvæ of several species of leaf-horned or Lamellicorn beetles. White grubs, both large and small, may be generally recognized by their plump, wrinkled body, nearly equal in diameter or a little enlarged toward the anal end, which terminates obtusely. They are more or less covered with brownish hair and partially curl up when at rest. The head is large, yellow or brown, with very large, powerful jaws and with rather long legs of a dirty yellow color. The body of the insect is whitish, or with a yellow tint, from which it derives its common name. We have throughout the eastern and central states quite a large number of species of beetles with this kind of larvæ, and among them are many that are more or less troublesome. The larva of the rosechafer, or rosebug, is one of these white grubs, and is quite frequently found in grass lands on light soil. The larvæ of many of the vinechafers are found in similar situations, while those of the June-bugs or May-beetles are, perhaps, the most common. It is very difficult to distinguish between these creatures, and practically it is not a matter of very much importance, but there is one species which is sometimes the chief, if not the only, offender (see fig. 66), differentiated from all the



Fig. 66. The fig-eater, *Allorhina nitida*. a, the larva; b, the pupa; c, the adult or beetle; d, e, f, g, larval details, enlarged.—After Riley.

others by the fact that it is very densely clothed with quite long brown hair, and if removed from its home within the soil

travels rapidly on its back, wriggling along much more actively than any of the other species found under similar circumstances. This hairy creature is the larva of *Allorhina nitida*, also called the fig-eater, or bumble-bee beetle, from the buzzing noise it makes during flight.

Ordinarily, when we find a white grub nearly a quarter of an inch in diameter and somewhat more than an inch in length, without any hairy clothing, we can take it for granted that it is the larva of one of the May-beetles, or species of *Lachnosterna* (see fig. 67). These beetles fly only at night, be-

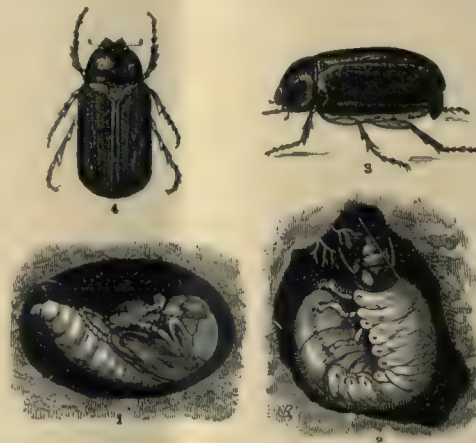


Fig. 67. May-beetle, *Lachnosterna* species. 1, the pupa in its earthen cell; 2, a larva feeding on grass-roots; 3, 4, adult or beetle from side and above.—After Riley.

ginning just as soon as it becomes dark, and continuing until midnight or, if it is sultry, until long after that period. They are strongly attracted to lights, and we may often notice them about electric-lamps, or even beating against common gas-lights. In this stage they feed upon the leaves of various trees, and sometimes do quite considerable injury to shade-trees. Occasionally, where a few fruit-trees are grown in a garden more or less surrounded by lawns, they gnaw the stalks of the forming fruit, or even of the blossoms, and so do much damage. Before morning, in every case, they return to earth, burrowing a short distance below the surface in some cases, or crawling deep into grass-tufts, but, at all events, concealing themselves completely. The eggs are laid in the ground itself among the roots of the grass, and the larvæ when they hatch at once begin feeding. They live for two or three years in this stage, growing very slowly, and, on the whole, not eating very ravenously. It is only when they become very abundant that serious injury results, or when, after Grass, Strawberries or other plants are set, so that a comparatively few plants replace a great number. An old sod is, however, very apt to become infested by successive broods, and much damage may then be done, the roots being in some cases eaten off clean, and the grass becoming brown on the surface and eventually dying. Toward the end of the third summer the larvæ go down a little deeper—say, from six to eight inches—excavate for themselves a clean earthen cell, change to a pupa, and shortly thereafter into an adult beetle, which does not emerge, however, until May or June following. The larvæ of the fig-eater grow more rapidly, and are often much more abundant than those of the May-beetles, and their work beneath the carpet of sod is sometimes so rapid and so complete that the whole can be rolled up like a rug, every fibre of the roots attaching it to the soil having been destroyed.

REMEDIAL MEASURES.

It is always a matter of interest to determine what is causing the injury that we observe; but, after all, the important question is, what can we do to check it? Where land is kept in grass for a year or two only, in the ordinary rotation practiced on the farm, the insects rarely become very abundant, unless the rotation is a bad one—that is, when grass crops follow each other for too long a time. On lawns, where the object is to keep the grass as long a time as possible, the difficulties are enhanced, and where white grubs are abundant, more or less injury will always be caused. Indeed, all the insects infesting grass lawns will have a tendency to multiply, and entire exemption from injury can hardly be expected.

One of the simplest measures is frequent cutting and rolling. This has a tendency to drive off the Lepidopterous insects that may be among the grass, and to prevent the laying of eggs. Many of the click-beetles are also destroyed by this process and more are driven off, so that even as against these some benefit may be had. The May-beetles, flying only

at night and remaining underground during the day, are less likely to be disturbed, and the measure suggested is of least benefit as against these.

The grass should be always kept well fed; but so far as possible, after the ground has once been put into good condition and a good lawn has been obtained, use no barnyard manure. All insects do very much better in a soil containing a great quantity of vegetable matter, and are least at home where mineral fertilizers are constantly used. Lawns should be fed almost entirely with mineral fertilizers, nitrate of soda being used to furnish the necessary nitrogen, and kainit or muriate to furnish the potash. None of the phosphates in ordinary use have insecticide qualities, so it does not much matter in what form this is put on. It is also a good plan when using these fertilizers to apply them quite heavily and to make the application during or just before a rain, that they may be readily dissolved and washed into the soil. No insects like salt, and kainit contains a considerable amount of both chloride of sodium and chloride of magnesium. A great many of the young insects are at once killed by this application, and the others will not feel inclined to feed much so long as any trace of it remains about them.

Where land is badly infested, especially if by white grubs, it is a very good plan to plow or dig up the sod, and if chickens are available, turn them in for two or three days and allow them to pick up everything in the way of insect life that they can find. Chickens are very fond of white grubs, and will dispose of a very great number of them if given an opportunity. If the ground be turned over more than once, so as to expose as many as possible of the insects, the work will be the more thorough.

It has been found practical to use kerosene on a small scale on lawns, and with very good effect as against all underground insects. Kerosene is, of course, a contact poison and exceedingly effective wherever it can be brought in touch with creatures in which the spiracles, or breathing-pores, are not too well protected. An emulsion should be prepared in the ordinary way, that is, according to the following formula: Hard soap, shaved fine, half-pound; soft water, one gallon; kerosene, two gallons. Dissolve the soap in the boiling water, warm the kerosene slightly, then pour the boiling hot soap-suds into the kerosene and churn with a small force-pump until the oil and suds are thoroughly mixed and form a pure white, soft butter. Where the mixture is very hot and the churning is active, five minutes will serve to prepare a perfect emulsion. The colder the mixture and the less thorough the churning the longer the time required to procure the butter. This emulsion may be readily diluted with water, and using from ten to fifteen parts of water to one part of the emulsion makes a sufficiently active mixture to apply liberally to infested grass lawns. It can be put on with an ordinary sprinkling pot, and should be applied so as to thoroughly moisten the soil. If it does not rain within twenty-four hours use a hose, if one is available, to wash the kerosene deep into the soil, and a considerable amount of water may be applied. This will carry the oil down, and it will kill whatever it touches there, without hurting the roots of the grass or other plants. The addition of water should be continued for at least three days in succession, unless it rains sufficiently to wet from two to three inches below the surface, or to the bottom of the grass roots. Of course, this material is useful only on lawns, or where the amount of land to be protected is limited. It would be altogether too expensive to use in ordinary field practice, but is very effective where it is used to protect only a small area. An application of this kind was made on the Capitol grounds at Washington in 1888, under the direction of the then entomologist, Dr. C. V. Riley, and it proved a decided success. It has been used by others on a smaller scale and always with benefit. The application may be made at any time when the presence of destructive insects working on the sod is determined. If land is at this time (November) badly infested, the emulsion can be applied diluted ten times, and in considerable quantity, so as to make certain of killing all the grubs at whatever depth they may be. In spring the land can be reseeded, and will then be free from insects for a time at least.

New Jersey Experiment Station, New Brunswick.

J. B. Smith.

Foreign Correspondence.

London Letter.

CAMOENSIA MAXIMA.—This plant is now flowering for the first time in a stove at Kew, where it was planted about ten years ago in a raised border beneath which there are

several hot-water pipes, its shoots being trained close to the roof glass which faces south. Here it has grown rampantly, and if unrestricted would long ago have covered a very large area with its stems, which are produced freely all over the bed from the thick woody roots. The flowers are borne in a terminal erect raceme (not drooping, as hitherto believed), and there are eight buds in each raceme, at first covered with a rusty brown tomentum. The expanded flowers have a greenish tomatose, tubular, five-lobed calyx over three inches long, and white petals six inches long, the largest, or vexillum, being four inches wide, the others much narrower; the margins are elegantly crisped and colored pale gold. The odor of the flowers is powerful and suggestive of vanillas. This plant was introduced to Kew in 1873, when Mr. H. Monteiro sent seeds of it from Angola, where it was discovered by Dr. Welwitsch and described and figured by Bentham in vol. xxv. of the *Transactions of the Linnean Society*. I am told that it is now flowering also in two other gardens in England. It flowered in Ceylon two years ago.

VANDA SANDERIANA.—The largest and most floriferous specimen of this grand Vanda ever seen in Europe was exhibited at the last meeting of the Royal Horticultural Society by Mr. J. G. Fowler, of South Woodford, in Essex. It was nearly four feet high and three feet through, and consisted of eight strong, well-leaved growths, upon which were eleven flower-spikes, bearing an aggregate of one hundred and twenty expanded flowers of exceptionally large size and rich in colors; the largest spike bore fifteen flowers. Such a specimen of an Orchid, which at best is a bad grower and one of the most difficult of all to import, created quite a sensation, and was awarded the gold medal of the society by acclamation. It was imported from Mindanao by Messrs. H. Low & Co. about a year ago, who attribute its exceptional growth here to the care taken of it by their collector, Mr. Boxall, who brought it over in his own cabin and tended it carefully all the way. Under ordinary care this Vanda suffers severely during transport, and is generally found difficult to establish.

CYCNOCHUS CHLOROCHILON is grown exceptionally well in the Edinburgh Botanic Garden, where I lately saw a plant which had matured pseudo-bulbs two feet long, and upon one of them there had been two racemes, one with five, the other with seven, flowers. Altogether, the plant bore thirty-five flowers, all open at once, and the same pseudo-bulbs were again pushing out racemes from the nodes below where the others were developed. This plant is a male, but in the same house with it was a female, which had borne racemes of only two flowers, differing from the male flowers in being larger, thicker, with a much shorter column. These plants were grown in a hot-house along with Vandas, etc., and were suspended in baskets near the roof glass. This species has done well also at Kew this year, where it is now in flower. The large creamy-looking flowers are a great attraction to visitors, who are most delighted when they see an Orchid-flower which suggests some animal, and the resemblance of this *Cycnoches* to a swan is quite striking.

CATTLEYA APOLLO.—This is a beautiful hybrid of Veitchian origin, its parents being *Cattleya Mossiæ* and *C. Aclandiae*. It is quite distinct from all other hybrids, and was awarded a first-class certificate by the Royal Horticultural Society a fortnight ago. It is dwarf in habit and the flowers resemble those of *C. Aclandiae* in form and substance, while in color they are like those of *C. Mossiæ*. The sepals and petals are about three inches long, rose-colored, shaded and faintly blotched with purple; the lip is broad, somewhat flattened, and is colored crimson-purple in front, yellow at the base and a pleasing shade of rose on the side lobes.

CATTLEYA TRIUMPH.—This hybrid between *Cattleya Lawrenceana* and *C. speciosissima*, and raised by Mr. C. J. Ingram, was also awarded a first-class certificate. It may be called an enlarged *C. Lawrenceana*, the flowers resembling some forms of that species in color, but being about

half as large again; they are rosy lilac, with a purple blotch on the front lobe of the lip.

AGLAONEMA CURTISII.—This is another addition to the garden representatives of this genus which is related to the *Alocasias* and appears to have its headquarters in the Malay Archipelago. *Aglaonema Curtisii* was exhibited by Messrs. J. Veitch & Sons at a recent meeting of the Royal Horticultural Society and was awarded a first-class certificate. It forms a tuft about two feet high, with erect fleshy oblong leaves a foot long and five inches wide, colored deep green, blotched and streaked with a pleasing gray-white. It resembles all the other species in its preference for hot moist treatment and a light rich soil. We find that all these ornamental-leaved aroids are happiest when the soil for them is renewed annually and the mixture used is of such a nature as to afford them plenty of nourishment and to permit of copious waterings almost daily throughout the summer months. In Continental gardens, where these plants are favorites, they are grown in large numbers together in wide pans or shallow pots.

PTERIS CHILDSII.—This is one more of the numerous seedling sports of *Pteris serrulata*, perhaps the most diversified as well as the most popular of exotic Ferns. It was shown as a new hybrid or sport by Mr. Childs, of New Eltham, and received a first-class certificate from the Royal Horticultural Society. It is of robust compact habit, the fronds graceful and the pinnæ broad, these being again divided along the margins and crested at the tips in the most extraordinary yet elegant plumose fashion. Apparently it is barren, the exhibitor having not yet seen a frond of it bearing sori. Fern experts, particularly growers of market plants, looked upon it as a most valuable addition to quick-growing decorative Ferns. There are already dozens of well-known named varieties of *P. serrulata*, every one of which would take front rank with the best of easily grown useful Ferns.

LOBELIA GERARDI.—This is a garden hybrid of Continental origin, its parents being *Lobelia syphilitica* and *L. cardinalis*. It was first brought into notice in 1893 in the *Revue Horticole*, p. 462, and it has since attracted considerable attention on account of its free growth under ordinary cultivation, and the attractions of its erect spikes of rich blue flowers. It resembles *L. syphilitica* in habit, forming in a few months a mass of erect leafy stems, bearing spikes from six inches to a foot long crowded with flowers. It has not yet received much attention in this country, but I saw a batch of it in flower at Chiswick in August, and at the last meeting of the Royal Horticultural Society some plants of it were shown by Sir Trevor Lawrence and received an award of merit. It is a distinct and useful addition to the tall perennial *Lobelias* which are nowhere more at home than when planted in wet ground near the margin of lakes or streams.

London.

W. Watson.

Plant Notes.

Notes from the Santa Monica Forestry Station.

EUCALYPTUS CORYMBOSA.—Two specimens of this Eucalypt, the Bloodwood-tree of Australia, are now in bloom here for the first time. The better one is a handsome, symmetrical tree thirty feet in height, with a spread of fourteen feet, and a trunk diameter (one foot from ground) of eight inches, representing a growth of eight years from the seed. The leaves are ovate-lanceolate, slightly sickle-shaped, glabrous, a rich dark green in color, paler beneath, with a conspicuous white midrib. They resemble somewhat the leaves of the Sugar Gum, *E. corynocalyx*, but are larger, more symmetrically shaped and differently and more finely veined. The new leaves are light yellowish green, with dark green veining, and very attractive; the leaf-stalks and young branchlets are dull crimson. The few-flowered umbels of conspicuous white blossoms are borne in large, showy, rather loose, corymbose panicles on the ends of the branches, giving the tree a most ornate appearance. The

outer layer of the bark is ashy gray, and is deciduous in small, thin flakes, exposing the under layer, which is red-brown, smooth and finely fissured. As an ornamental tree *E. corymbosa* ranks with the best of the *Eucalypti*. Economically it is of especial value in southern California for bee pasturage at this season of the year, when bee-feed is scarce. Its timber, however, according to Australian authority, is not of much value, owing to the amount of kino it contains, whence the popular name of Bloodwood.

PARKINSONIA ACULEATA.—November finds a few flowers and not a few buds still lingering on this strikingly attractive plant, after a blooming season lasting all through the long Californian summer. Ours is a spreading, shrubby specimen, about five feet in height. Its curious, bright green, bipinnate leaves, with three pairs of long, needle-like, winged pinnæ from six to eighteen inches in length, and numerous tiny, oblanceolate leaflets, give it a very graceful, airy appearance. This effect is heightened by the slender, loose racemes of bright yellow, stellate flowers on slight, but rigid, yellowish green peduncles. Botanically remarkable are the short, thick petioles, each ending in a stout, sharp spine, and with two smaller, stipular spines at its base. When the pinnæ have fallen away, the petiole persists as a formidable spine, constituting, with the stipular spines, a horrent combination in striking contrast with the airy elegance of the general effect of this charming plant.

HAKEA LAURINA.—On the high bluff overlooking the station to the west is a fine, bushy specimen of this most ornamental tree, at present in full bloom. The peculiar, deep red and white, globular flower-heads, borne in lavish profusion all over the tree, and well set off by the dull-green foliage, produce a striking impression. This tree is succeeding well on the adobe soil of the mesa lands. Planted some ten years ago, it is now ten feet in height, with a compact, bushy crown eight feet in diameter. It has bloomed and borne seed for several years.

Santa Monica, Calif.

John H. Barber.

New or Little-known Plants.

Nymphæa stellata, var. *Eastoniensis*.

NYMPHÆA STELLATA, often catalogued as *N. cœrulea*, is one of the best of the Water-lilies, bearing a clear, light-blue flower, delicately scented, and from six to eight inches across. The flower which we figure on page 475 is a seedling of this plant, raised in the gardens of Oakes Ames, Esq., and named *Eastoniensis*. It was shown at an exhibition of the Massachusetts Horticultural Society in September last, where it received favorable mention. The color of the flower is a steel-blue, and it differs from those of the type in that it does not show so distinctly the stellate form, the petals being broader and more rounded at the end. The flower is somewhat larger than in the true *N. stellata*; the leaves are longer, oval in shape and more deeply toothed. The new plant grows rather more vigorously than the type and has longer and thicker flower stems. The seeds of *N. stellata* were sown in December, 1895, and the seedlings were potted up late in January, or as soon as they could be handled and grown in a tank where the water was kept at a temperature of about sixty-five degrees, Fahrenheit. About the middle of June the seedlings were planted in a shallow pond with a bottom composed of good turfy loam, enriched with some bone-meal and well-rotted cow-manure. All the plants grew luxuriantly, and they were generally of the regulation form, excepting two, one of them being this variety, *Eastoniensis*.

Cultural Department.

A Fungous Disease of the Apple.

IT is not uncommon in Delaware to see apples dotted with little black spots not unlike fly-specks in general appearance. The popular name given by fruit growers to this condition is "Blackbirds," though the reasons for this

appellation are difficult to determine. A more appropriate name suggested by Professor Chester would be the Fly-speck fungus. All varieties that I have examined are affected to a greater or less degree, and some, like the Jackson, are often so seriously peppered with these little specks as to injure their market value. The spots, or "fly-specks," are generally grouped together, forming circles or irregular patches from a quarter to an inch or more in diameter. The skin of the apple around these aggregations of spots becomes clouded or fogged, and when the trouble is serious the foggy areas coalesce, giving the apple

The most serious objection to the fungus lies in the sooty appearance it causes on the fruit, which in many instances is so marked as to injure the market value of the apple.

It may be that this will prove another disease which the orchardist now has to combat, and if so, its superficial character would make it easy to reach with fungicides. Botanically the fungus belongs in the Leptostromaceæ, and is described by Saccardo in his *Sylloge Fungorum*. It was first noticed by Montagne and Fries in the *Ann. des Sci.*, 2, 1, p. 347, and called *Labrella Pomi*.

Experiment Station, Newark, Del.

G. Harold Powell.



Fig. 68.—*Nymphaea stellata*, var. *Eastoniensis*.—See page 474.

a dark, sooty appearance. This blemish on an otherwise perfect apple cannot be ascribed to "Blackbirds" or "Flies," but is due to an obscure fungus called *Leptothyrium pomi* (Mont. et Fr.), Sacc. The disease has never been serious enough to be of economic importance, and is not even mentioned with other fungi attacking the apple. The effects of the fungus do not extend below the skin, being confined entirely to the surface. It does not cause rotting, but the tissues around the spots shrink, so that in the worst cases the apple presents a shriveled appearance.

The Protection of Strawberries.

IT is always advisable to give Strawberry beds protection in winter, but it should be remembered that this practice is not intended to keep the plants from severe cold, but to secure an even temperature which will prevent alternate thawing and freezing and the heaving of the plants. If suitable material is used, it can be left on the beds until the bearing season to keep the berries clean and help to prevent the evaporation of moisture from the soil. The best material to use for this purpose depends upon its cost and convenience in different places. Coarse stable-manure is liable to ferment, and if it does not

do this it is too warm and will smother the plants if put on thickly, so that they come out in the spring blanched and sickly. Straw of oats, wheat or rye has good points and is nearly always available, but it is objectionable because it contains seeds of weeds, and the grain itself is a weed in a Strawberry bed. Where good marsh hay can be found which contains no foul seed, it makes an admirable covering, for it is not easily blown off and can be allowed to remain as a safeguard against early frosts and as a summer mulch. Dry leaves are also good and they are almost always to be had. They should be scattered thinly over the bed and then held in place by a few corn stalks or pea brush. They, too, can remain during the summer, and when they decay will add fertility to the soil. In Maine the boughs of Spruce and Pine are sometimes used. They hold the snow in place, are sufficiently thick to be a non-conductor, and yet are not so dense as to prevent the circulation of air. In the southern mountain regions where there are Pine forests, the needles furnish an ideal material. They are clean and easy to apply, they lie so close to the ground that the wind does not move them, and yet are sufficiently open to give good ventilation, and even if they chance to be heaped up in places by the wind more thickly than needed they do little harm. Besides this, their resinous quality is said to repel insects. Indeed, so many things are available for protection that any gardener, unless he totally lacks ingenuity, can find something to serve his purpose. The time to apply the cover is after the ground has frozen hard, so that a cart or wheelbarrow will not cut into the surface.

Montclair, N. J.

S. C.

Chrysanthemums.

RECENTLY, a committee from the Massachusetts Horticultural Society paid a visit to the greenhouse belonging to William Nicholson, a commercial grower, of Framingham, Massachusetts, to inspect his Chrysanthemums. Space is valuable, and not an inch of room under glass is wasted here. Everything is creditably clean. Like all progressive florists, the owner knows the value of order and cleanliness. We did not look for exhibition blooms. The trade does not require such. Yet we found blooms which would grace any exhibition board, although double the number is planted in the space required for such blooms. Smaller flowers—that is, smaller than they ruled some years ago—are the rule; but, unfortunately, the same stiff character prevails. The florist must grow flowers which pack and carry well. The retailer requires, in addition to these qualities, that they keep and ship well, and are easily handled. It will be some time yet before we shall see the artistic types, without which grace, beauty and harmony of arrangement cannot be secured. Even in Horticultural Hall, Boston, where the greatest latitude is allowed, the monotonously rigid arrangement prevails.

Decided colors are the rule. Mrs. Perrin is declared to be the best true pink-colored variety yet introduced. Ada Spaulding, with pink and yellow shadings—a finely built, incurved bloom—is yet a favorite. Stiffness also is its prevailing good quality. W. H. Lincoln, a remarkably good yellow bloom of the reflexed Japanese type, though discarded by many growers for lack of size, is considered one of the most profitable. It certainly is a satisfactory one to buy. Few yellow blooms last as long when cut. S. T. Murdock is a reflexed pink, and one of the best late varieties of its color. There is something peculiar about the appearance of the blooms under bright light. The upper surface of the florets glistens and refracts sunlight. Under these conditions the blooms appear faded, but when the sun is down they are fairly luminous. For parlor decoration it is the ideal. John Shrimpton, a maroon of recent introduction, fills a gap among varieties of its color. Up to the time of its introduction, four years ago, the only really good dark-colored variety was Cullingfordi. We had had others, notably G. W. Childs, which was superb where it succeeded. It is now discarded as a cut-flower variety on account of the unexplainable habit which is best termed "burning," though this occurs as well in shade as sunshine. Mr. Brydon once said of another recent introduction, William Seward, of nearly the same shade, that it would burn in a cellar. John Shrimpton, when well grown, produces a bloom almost as large as G. W. Childs, and does not "burn." Moreover, it is dwarf and can be grown on side benches with from three to four feet head-room. Minnie Wanamaker was introduced less than ten years ago, but is now rated as an old variety. It holds favor from the fact that it is one of the best late white-flowered kinds that ship well. It may be cut before fully matured, and has some value on that account. Mrs. Henry Robinson is unsurpassed in elegance of form and in every other way to all true lovers of

the beautiful. The florist, however, wants a stiff stem. All other qualities prevailing, weakness in this particular affects its value in the market, and this it lacks. In our display at Wellesley the blooms are allowed to bend and turn with freedom so long as they do not obstruct the path. Here Mrs. Robinson is seen becomingly. Helen Bloodgood is a fit companion for the last-named, and, like it, its deep, perfect blooms of glistening rose-pink lack a rigid stem. Cullingfordi is yet indispensable, for, while John Shrimpton comes near to it in color tones, it is not quite equal.

Wellesley, Mass.

T. D. Hatfield.

Broad-leaved Evergreens.

OUR experience with broad-leaved evergreens has not been very satisfactory. Aucubas of different kinds, both the plain green and the spotted-leaved varieties, live out-of-doors with us, surviving the coldest winters, but they grow so slowly that they cannot be counted on to make large bushes. Their tops are often killed by severe frost, and thus they are apt to lose in winter all that they gain by a summer's growth. Also our summers seem to be too dry for them. Mahonias do better. They increase slowly, and do not winter-kill so badly, though the foliage is usually damaged more or less by the cold. The handsomest of them here is M. Japonica, but none of them flourish with us as they do in Washington. When I saw, some years ago, how these beautiful shrubs were used in decorating the public grounds in Washington I bought numbers of broad-leaved evergreens for our home grounds. Very few of them have made satisfactory growth. The most beautiful little tree of this class at Rose Brake is Osmanthus ilicifolium, which seems perfectly hardy without winter protection, and grows faster than our native Holly, which it resembles in foliage.

A group of Evonymuses of different kinds, both deciduous and evergreen, is now exceedingly interesting. Of these the finest was obtained some years ago from John Saul under the name of Evonymus Sieboldii. This has far outstripped the commoner Japanese evergreen variety in growth, and is now a round, bushy shrub, four feet in height, with broad leaves, lighter in color than those of E. Japonicus. Its foliage is sub-evergreen in character and usually remains upon the branches until Christmas in this climate. The fruit, as I once saw it in Washington, is a brilliant red. My own specimen has not fruited as yet. Its chief attraction up to this time has been its foliage and its flowers. The blossoms of most Evonymuses are small and insignificant, and they come at a time when so many showy plants are in bloom that they pass unnoticed. This is not the case with E. Sieboldii. Late in August of this year, when scarcely any other shrubs were blooming, it was covered with conspicuous cream-colored flowers larger than those of any other Evonymus known to me, and so abundantly produced that the little plant presented a most beautiful appearance and made one of the chief attractions of the garden at that time. The flowers are of great duration, and even as late as the middle of October fresh buds were opening every day. The failure to set fruit was possibly due to the very dry weather which endured through the months of August, September and October. I can heartily recommend this little shrub to all lovers of beautiful plants. It seems hardier than the common Japanese evergreen Evonymus, whose foliage turns yellow after severe cold weather, although it persists upon the branches until pushed off by the new growth in spring. The tops of the branches also winter-kill, which does not seem to be the case with E. Sieboldii. Farther south this variety is said to be evergreen.

Rose Brake, W. Va.

Danske Dandridge.

Correspondence.

Notes from the Arnold Arboretum.

To the Editor of GARDEN AND FOREST:

Sir,—The Ilexes are fruiting with uncommon abundance this year; the yellow-fruited form is singularly beautiful just now, and is admired by every one who sees it. The Evonymuses are still beautiful, especially E. atropurpureus and the variety Coccinea of E. Europaeus. There is another variety with white capsules, which make a striking contrast with the scarlet brils. Pyrus arbutifolia and P. nigra are covered with red and black fruit, making both plants as interesting at this season as they are beautiful in flower. Celastrus paniculata still holds its fruit, and if its branches were cut early they would be useful for decorative purposes, as the brilliant fruit hangs on all winter. The blue-black fruit of Memispermum

Canadense is especially large this autumn, but *Berberis Thunbergii* is still the brightest of our autumn-berried plants, and I can recall no other shrub of comparatively recent introduction that has given so much satisfaction at all seasons. The Bayberries are more fruitful than ever this year and the bluish-gray berries show up admirably. *Rosa lucida* is a mass of scarlet; the white fruits of *Symphoricarpos racemosus* are still in good condition, while those on *S. vulgaris* are just coloring red. These autumn fruits make a show that is quite as satisfactory, and, in some cases, even more so than the flowers do earlier in the season. Yesterday the Forsythias were flowering more freely than they did last spring, and quite a number of flowers could be plucked from *Daphne Cneorum*, *Erica vagans*, *Lonicera Morrowii*, *Pyrus Japonica*, *Genista tinctoria* and several more.

Jamaica Plain, Mass.

Jackson Dawson.

Lemons in California.

To the Editor of GARDEN AND FOREST:

Sir,—The lemon is not often mentioned, if at all, in accounts of the early California orchards, and only within the last three years has it had any standing, either actual or prospective, as a fruit for export. An acknowledged authority on horticulture in California, in a work published only five years ago, thus summed up the situation, as it was then: "The lemon product of California is very small. The tree is less hardy than the Orange, and is otherwise more exacting in its requirements. For this reason it is probable that a much smaller area of California is adapted to the commercial production of the lemon. The fruit also has a grievous competitor in the imported Sicily fruit and the popular favoritism for it, which, like many other popular fancies, amounts to a blind prejudice. There is, however, reason for the preference for the imported fruit, when one considers only the relation of the common California seedling lemon to the Sicilian fruit, for the common California seedlings are very poor, overgrown and coarse, deficient in acid and full of bitterness, prone to decay even when fairly handled. But when the comparison is drawn between a few improved varieties, which are now quite largely produced and properly cured by a few enterprising growers, California lemons have nothing to fear from the imported fruit, except popular prejudice. Still, there is progress being continually made by the few growers who have confidence in the home product, and intelligence and diligence to properly prepare it for marketing, and they find the fruit very profitable. It now seems assured that the next few years will bring California-grown lemons into better repute and larger supply."

This quotation contains a prophecy which is now being fulfilled, and also some statement of the difficulties under which California lemon growers labored only five years ago. The growth of the orange industry was more rapid for the reason that the Washington Navel variety was seen at once to be so good an orange that its ultimate popularity in the markets of the east was a question only of time and persistence. Moreover, this orange was found to be adapted to many different sections of California. No universally accepted variety of lemon was known, and growers ten years ago were all at sea as regards varieties, soil, propagation, cultivation and methods of curing. As usual, under such circumstances, a few enthusiastic pioneers took all the risks, and demonstrated to slower and more timid men what could be done with the lemon in California. Some of these venturesome planters reaped large rewards from their foresight. One of them, Mr. G. W. Garcelon, of Riverside, for several years realized as much as from \$1,200 to \$1,500 an acre from his lemons. To one who did not understand the circumstances of the case this statement would appear fabulous. But at this time there were not enough lemons grown in California to supply the home demand. Very few people made even a tolerable success at curing them, and Mr. Garcelon, who did make a success and had the secret of keeping his lemons in storage until there were no others in the market, sold his product in San Francisco at \$5.00 and \$6.00 a box. Two hundred, or even four hundred, boxes to the acre is not an unusual yield, and it is a simple problem to figure out the resulting profits. Mr. Garcelon was supposed to possess some wonderful secret process of curing because the quality of his lemons was so much higher than that of others. He was importuned to give away or sell his secret. It is said that even the state tried to buy it, but, for a long time, he refused to sell, and continued making a brilliant success where others failed. Finally, four or five years ago, he divulged his process, the details of which were published everywhere in California. It was found to be not a method of pickling, preserving or forcing, as many had supposed, but

simply a system of curing with great care and attention to handling the fruit, to temperature and to other details. This process, with some modifications by different packers, has been generally adopted, and has settled in great measure the question of curing.

The Lemon is a perennial bearer—that is, it produces several crops a year, although the largest and best crop is ready for picking between the first of December and the first of April. To get the best results lemons must be picked every month—at least ten months—of the year. This fact complicated the problem very much, as the individual grower, in most cases, did not gather enough lemons at a time for a profitable shipment and did not know how to keep them. This difficulty, with others, as will be shown later, has been overcome by experience and concerted action. The question of soils and localities was for a long time discussed without settlement. Some growers recommended a sandy loam or a sandy, gravelly soil; others a deep, rich, red soil; others a sedimentary, clayey loam. It has been found that the Lemon does well on all of these soils, but my opinion is that a sandy loam which is not too sandy is probably the best. The character of the soil may exert some influence not yet fully understood upon the curing and keeping properties of the fruit. Some growers argued that the Lemon would not do well near the coast, yet the largest Lemon orchard in the world, comprising one thousand acres, has since been planted near San Diego, only a few miles from the coast, and San Diego County has more Lemon-trees than any other in California. Others contended that the Lemon would not thrive in the hot valleys of the interior, yet it does well in San Bernardino and Riverside counties, where the summer temperature, in the shade, is sometimes a hundred and five degrees. Locations near the coast which will not produce the best oranges grow very fine lemons; but, on the other hand, in some of these localities there is some smut on the lemons, and they have to be washed, while those grown farther inland are much brighter and cleaner. The Lemon is more susceptible to frost than the Orange, a fact which must be considered wherever it is planted, but, apart from this fact, it is doubtless true that first-class lemons can be grown over a wider area in southern California than first-class oranges, and that the Lemon will do well on as great a variety of soils. Irrigation was another greatly mooted question a few years ago. Some thought that the Lemon needed much more water than the Orange; others thought it needed less. Common sense and experience have decided that no general rule can be established, but that the amount of irrigation varies with the character of the soil and the climate. Each grower must test for himself the conditions of his own soil and location. But the amount and time of irrigation, as well as the use of fertilizers, undoubtedly have great influence upon the quality of the fruit and the time of ripening. If too much water is used the fruit is overgrown and coarse. Irrigation deferred until late in summer delays the blossoming and budding, and consequently the ripening of the crop. Chemical fertilizers alone are valuable for the Lemon. All others tend to produce growth of wood rather than of fruit, a growth which is not needed or wanted, as the Lemon, in many locations, grows so fast that half of the new growth has to be cut back every year, and to force wood-growth is simply to add to this waste.

Theory and fact, which are so often opposed in fruit-growing, were diametrically opposite in the matter of propagating Lemon-trees. Theorists argued that the best lemons must necessarily come from trees grown from lemon seeds, or from cuttings taken from Lemon-trees. They saw an absurdity in budding the Lemon, which is a sour fruit, to an Orange, the most desirable quality of which is sweetness. Yet this apparent contradiction is now universally practiced in southern California, after years of discussion and experimentation. The Lemon does not come true to name from seeds, and buds which are grafted upon an Orange root produce better fruit than buds grafted upon a Lemon root. This was long a vexed question and is a good illustration of the fact that experience alone can teach what is best in the growing of fruit.

Three varieties are now accepted in California as the best, and little is heard of any others. These are the Lisbon, the Villa Franca and the Eureka. The two former are importations from Europe; the Eureka originated in California. The Lisbon is a thorny tree; the Villa Franca is thornless, and the Eureka is nearly so. The Lisbon makes the largest tree of the three and is a very prolific bearer. Its fruit is of a uniformly medium size, is strongly acid and is a good keeper. For these reasons it is a very popular variety, although the flavor of the Eureka is preferred by most people. These two are more often planted than the Villa Franca. The Eureka bears fruit every month in the year.

As soon as it was seen that the lemon would become an important commercial factor, middlemen prepared to handle the product by erecting houses especially prepared for curing and storing it. This lightens the labor of producers and is a great benefit, especially to owners of small orchards. A dozen or a thousand boxes may be taken to one of these establishments and disposed of. They are either bought outright or are packed and sold on commission for the grower. The absolutely essential thing in gathering the crop is very careful handling, as the slightest bruise on the skin of the lemon will cause it to rot. Lemons are picked according to size and not according to color—another point which had to be learned by experience—and they should be gathered in baskets as they are then less likely to be bruised than when picked into the more convenient sack. Great care is taken in assorting lemons to have them of a uniform size, and the strictly fancy lemon is considered to be one weighing from three to five ounces two to three months after picking, and measuring from two and a half to three inches from blossom to stem end, with a nearly uniform diameter crosswise from two to two and a half inches. A common method is to test them either during or after picking with a ring two and a fourth or two and a half inches in diameter, all which will not pass through the ring being rejected. The former size packs about 360 to the box, and the latter 300, these being the sizes which have always been most popular in the Sicilian lemon.

The curing and packing houses are built of cement or stone or with double walls, the space between being filled with sawdust or some similar substance, so that a uniform temperature may be maintained. Free ventilation is provided for. The lemons, after being assorted, are packed away on trays so that the different layers do not come in contact with each other. The lower the temperature and the less circulation of air the slower is the process of curing. This may, therefore, be regulated in such a way that the lemons are cured in a few weeks or are kept for several months to meet the varying conditions of supply and demand. After they are once cured they will stand a great deal of rough usage and bear transportation well. They are frequently examined while curing, and any that show the slightest indications of deterioration are discarded. A temperature of sixty degrees, with a free circulation of air, cures the fruit in about four weeks. The greatest care is taken in packing the fancy lemons for shipment.

A fair price to the producer, and one which has recently been paid, is two cents a pound, which means \$1.40 a box. But this will necessarily vary. It has been as low as one and one-eighth cents. Lemon-trees are planted from twenty to twenty-five feet apart, which means as an average about one hundred trees to the acre. A conservative estimate of the yield is from 125 to 140 boxes to the acre, at six years of age, and four hundred boxes at ten years of age from the planting. A yield of five or six boxes to the tree, when in full bearing, is not unusual. Lemons would be profitable at one dollar a box to the grower. To this must be added fifty cents for picking and packing, ninety cents for freight, twenty cents for brokerage, and perhaps sixty cents for waste and other expenses. If they bring less than \$3.00 a box in New York, under present conditions, somebody is doing business at a loss, and that is usually the grower.

The improved varieties of California lemons are usually conceded to be as good as those grown anywhere in the world. They are said to have more citric acid and less "rag" than many of the imported varieties. Their keeping qualities, as compared with the foreign lemon, are still disputed, and it may be that Californians still have something to learn as regards curing. But the question of a market depends principally upon the points of production and foreign competition. In 1895 more than five million dollars' worth of lemons were imported into the United States, or more than two and a half million boxes. Up to the present time not more than 50,000 boxes a year have been sent east from California, this limited quantity being, of course, in addition to the larger quantity consumed on the Pacific coast and in adjoining territory.

A careful estimate places the number of Lemon-trees now growing in California at a million and a quarter, nearly all of them being in the seven southern counties of the state. About a quarter of a million are stated to be in bearing, although only a small proportion of these are in full bearing, a fact which shows the very rapid growth of the industry during the past three years. The crop will constantly increase until, five years from now, the Lemon-trees of California should bear a crop equal to the full volume of importations from foreign countries. In all probability there will not be a satisfactory market at first for the California crop and for importations also. But the enterprise of the California fruit growers, which

made a market for California oranges under equal difficulties, will doubtless finally solve this problem, and in the mean time the consumer will reap the benefits of keen competition.

Redlands, Calif.

William M. Tisdale.

Exhibitions.

The Fall Exhibition of the Horticultural Society of Chicago.

THE annual fall exhibition of the Horticultural Society of Chicago was held November 10th to 14th in large rooms which allowed effective grouping of the plants, with ample space for their examination. The cut flowers and table exhibits occupied a room by themselves, with standard and specimen Chrysanthemums and decorative plants for ornament. The three leading exhibits of Chrysanthemums were from Nathan Smith & Sons, Adrian, Michigan; E. G. Hill & Co., Richmond, Indiana, and Vaughan, Chicago, and many vases of cut flowers were exhibited by each of these growers which showed the range and quality of cultivation. Some of the familiar names of Chrysanthemums were missed, and others were represented only by an occasional specimen, but in the main the older and newer forms were quite equally distributed. Those offered in groups of six or more, and coming most frequently into competition for awards, were largely of newer varieties. This was especially true of the white sorts; the leading kinds shown, and which took most of the premiums, were Mrs. H. Robinson, Mayflower and Niveum. Many of the yellow varieties were also comparatively new, as Major Bonaffon, Golden Wedding and Jennie Falconer. With pink flowers it was the opposite, for the long-tested Vivand Morel led. This was partly true of the crimsons, with George W. Childs, but The Bard came into close competition. The latter, from its bright color, good habit and abundance of flowers, is finely adapted to bush or tree form, and some of the specimens were effectively trained into various forms. Mr. W. N. Rudd, of Chicago, showed several groups of plants in six-inch pots, each flower grown to a single stem, which was left so low as to stand without the supporting cane. Several ranged from ten to fifteen inches high. One group of twenty-five, the plants about twenty inches high, even in height and size of head, was arranged quincuncially on the floor with neat effect, a little orchard of Chrysanthemums. Though losing somewhat in size of flower and in foliage, these low-grown plants are useful for decoration on stands and tables in place of more evanescent cut flowers.

Two good white seedlings were offered by Nathan Smith & Sons. The one named Western King was certificated, and is a flower of good substance, similar to Mrs. H. Robinson, the head inclined to be deeper. The other, Mrs. M. A. Ryerson, was not entered for a certificate, being reserved, I suppose, for some other occasion, as it was the better of the two. The flowers were large, some terminal heads measuring thirteen inches from side to side over the top. The stems were stiff and adequate to sustain such heads. It has more regularity than the Mayflower. A card attached stated the parentage to be Snowball and Mrs. H. McK. Twombly. Both of these flowers were pure white, open sufficiently for the individual petals to show distinctly.

The competition among the growers of Carnations was keen. From three to four times the table space of last year was taken, and all but three of the twenty-two named varieties specified by the Society for premiums were represented. Forty-two named varieties were counted, and there were besides several more that were numbered, some of them distinct in color and markings, especially a lot sent for display by John H. Sievers, San Francisco, California. The forty-two varieties were distributed in color as follows: White, nine; pink, fourteen; red, eight; striped (with a white ground), four; yellow (all marked with red or crimson), seven. Most of the standard varieties were included, and were generally so well grown that the judges found it difficult in several cases to decide between the competitors, so that two and sometimes three awards were made in the same class. Of the introductions of 1896, two which obtained a first premium are worthy of mention. Jubilee has a red flower, larger and a little darker than Portia, but with the margins of the petals but slightly fimbriated, or frequently entire. Triumph is a darker pink than William Scott, and with larger blooms. Some from H. Weber & Sons, Oakland, Maryland, measured almost three inches in diameter, a dimension which is made a kind of goal by the Carnation growers. Of tested seedlings, Argyle, shown by Stollery Brothers, Argyle Park, Chicago, obtained a certificate. It is a pink, the shade deep, but very delicate, with a

blush of red as it ages. It comes nearest to Tidal Wave in color, but has a softer tinge of pink. It is likely to be popular, and has already been considerably distributed. Mrs. George M. Bradt was again certificated for Fred. Dorner & Sons, Lafayette, Indiana. It was even brighter in its crimson markings than in the flowers of this variety shown last year, and in other respects holds its own well. I was interested in comparing the changes in dimension of stem and calyx of the new and old varieties. As the blooms increase in size both of these must also enlarge. There is a steady gain in both respects, but with some loss in other ways, for the stouter stem lacks the grace of the more slender, old-fashioned garden Pink, and the calyx, increasing in diameter with but little added to its length, swells out and sometimes has a puffy appearance.

Reinberg Brothers, Chicago, and Poehlman Brothers, Morton Grove, Illinois, were the most successful cultivators of Roses, judged by their display and the awards obtained. They showed the principal market varieties, for growers of Roses are evidently chary of novelties. E. G. Hill & Co. showed the new Rose, President Carnot, a pink flower, shaded lighter than Bridesmaid or La France, but with the pink more pronounced than in Golden Gate, to which it is best likened of any that were shown; the foliage also handsome and quite distinct, unlike that of any variety which stood upon the tables. The leaflets are broad oval, of a lively green above, deeply tinged with pink beneath, and they come well up toward the flower and make a good setting for it.

Chicago, Ill.

E. J. H.

The St. Louis Flower Show.

THE St. Louis exhibition, held November 11th to 15th, was inferior in general effect to that of last year, largely because all the exhibits were on one floor and on nearly the same level. The satisfying perspectives that were the feature of last year's show were missed, and the view from the gallery was less satisfactory. There was, however, a distinct advance in the number and quality of Chrysanthemum plants. This is true of single-stem, pot and standard plants. Queen, white and Vivand Morel, pink, led in their colors in the single-stem class, A. Meyer, St. Louis, taking first premium for the best twenty-five of each. The St. Clair Floral Company, Belleville, Illinois, took first premium for yellow in the same class with twenty-five flowers of their 1895 seedling, St. Clair, which was not considered promising last year because of its weak color and doubtful shipping qualities. As shown this year the flowers seem firmer, but they have an undecided tint. Some excellent single-stem plants of Harry Sunderbruch were also shown.

In pot plants, Ivory and Channing, white, Golden Wedding and Major Bonaffon, yellow, Mrs. Hicks Arnold, deep yellow, Vivand Morel, pink, George W. Childs and The Bard, crimson, were the leading varieties. A very good plant of Hicks Arnold, with about 145 open flowers, was one of the best in the exhibition and won a blue ribbon for Mr. Vaughan, Chicago. Some of the best standards also came from Vaughan. Among them, Mrs. Governor Fifer, white, and Iora, an attractive light pink, with petals tubular their entire length, won first premiums in their class and color. Iora, a loose artistic flower, bore shipping better than some of the more compact flowers, and looked fresh and pleasing to the close of the exhibition.

In cut Chrysanthemums, white and yellow flowers outnumbered other colors, as usual. Queen predominated among whites, but good flowers of Niveum, Ivory, Minnie Wanamaker, Mrs. Eagan, Mrs. H. McK. Twombly, F. Pullman and Mayflower were seen in fair numbers, also a few of Philadelphia and Gretchen Buettner. One vase of a new white seedling, Western King, was entered by Nathan Smith & Son, Adrian, Michigan, in competition for the Shaw medal for "a plant of decided merit for cultivation, not previously an article of North American commerce." A plant is called for this medal, so that it was not awarded to these cut blooms. As seen here, Mrs. Eagan appears to keep better than either Mayflower or Florence Pullman.

Golden Wedding is decidedly the leading late yellow Chrysanthemum in St. Louis, Eugene Dailedouze being the favorite early variety. There was, however, a very good showing of flowers of Eugene Dailedouze, and, perhaps, more of the flowers of Major Bonaffon, but the latter were somewhat smaller than heretofore. A few of the variety, H. G. Sunderbruch, appeared among the cut flowers, and I saw one bloom of Pitcher & Manda, while no flowers of Challenge were noticed in the hall. W. E. Guy, Belleville, Illinois, took first premium for best twelve blooms of Niveum, white. Florence Pullman gained the blue ribbon for best twelve of any one variety. The Michel Plant and Bulb Company, St. Louis, took

first premium for best twelve flowers of Golden Wedding, and E. G. Hill for best twenty-four yellow flowers in three varieties, with Golden Wedding, Eugene Dailedouze and Modesta. Vivand Morel was again the only pink in point of numbers, but a dozen enormous blooms of Indiana won the first Shaw prize for best twelve of any variety introduced in 1894, 1895 or 1896, for E. G. Hill, Richmond, Indiana, who also took first premium for best twenty-four pink in three varieties with flowers of Vivand Morel, Murdock and Mrs. Perrin, as well as for an interesting collection of twenty-four assorted flowers, no two alike and all labeled.

As no premiums are offered for seedlings at this show, interest in Chrysanthemums centres in the entries for the Bent prize for "best vase of fifty, quality and arrangement to be equally considered." There were five entries, the two taking first and second premiums being composed of white and yellow flowers. First premium was won by William Schray, St. Louis, with a handsome arrangement of flowers of unequal merit, of Queen, Niveum, Golden Wedding, Eugene Dailedouze and three or four blooms of Philadelphia. The last were not an improvement, but marred the purity of coloring which, without them, was clean and clear. A vase of assorted flowers from W. J. & M. S. Vesey, Fort Wayne, Indiana, that took first premium in its section, contained the only specimens of Violescent seen at the show, no entries being made for the two premiums offered for the best twelve of that variety.

Some excellent Roses were shown. Ellison & Tesson, Mr. Fillmore and Mr. Trillow, all of St. Louis, won first premiums. Only single Violets were shown, mostly California. In Carnations, Alaska won in the white section, with Lizzie McGowan barred; Albertina was first among pink sorts, with William Scott barred, while Corsair stood first among red kinds. On the closing day Vesey Brothers, of Fort Wayne, Indiana, exhibited a fine vase of the variety Uncle John, in competition for a special premium offered by the Planters' Hotel. Several seedling Carnations were shown by the same firm, none of them named as yet. A red one, lighter in shade than Portia, seems decidedly promising. It is of medium fragrance, full, pleasing in color, and has, what most red Carnations lack, a good strong calyx. An attractive display of cut Orchids made by Eugene Wurst, gardener to Dr. S. Brown, Brownhurst, Missouri, comprised nearly sixty kinds; among twenty-six varieties of Cypripediums was C. Leeannum Masarceanum, the best of the many hybrids between Insigne and Spicerianum. This is the first time the Brownhurst collection has been directly represented at any show.

Brighton, Ill.

F. C. S.

Recent Publications.

Die nordamerikanische Holzarten und ihre Gegner. Von John Booth, Berlin, 1896.

In this vigorously written brochure the author renews his well-known advocacy of the naturalization of North American trees in Europe. He laments the fact that, notwithstanding the importance of experimenting with their culture was pointed out by Wangenheim and others more than a century ago, and though the existence of noble specimens introduced by them and scattered over Europe bears witness to their adaptability to climatic conditions there, no real effect on the science of forestry in the Old World has yet resulted therefrom. He attributes this largely to the bureaucratic opposition that all efforts in this direction have met with in such countries as Germany, where prejudice and, as he believes, downright ignorance are frequently conspicuous in forestry management. This opposition has lately found expression in an article by Oberforstmeister Weise in the *Mündener Hefen*, 1894, which serves our author as ground for a general review of the matter. In his criticism of Herr Weise's position he displays a knowledge of the subject and its literature that attracts attention, though his enthusiasm sometimes leads him to unnecessary severity. But he pleads his case with ability, and his enthusiasm seems often warranted. The relegation of many of the most valuable trees of the United States to the service of mere park ornamentation in Europe, when they have stood the test of soil and climate for a century, is, in his view, a serious mistake, and has resulted in a real loss to Germany, where the natural poverty of the forest elements might be relieved by the use of much valuable material from North America.

Notes.

Sixteen car-loads of grapes from California were sold here last week, the varieties being Flame Tokay, Cornichon and Verdell. Tangerine and Mandarin oranges, from Florida, are occasionally seen, and, more abundantly, grape-fruit of good quality, from that state and from Jamaica.

Vegetables Under Glass is the title of a little pamphlet just issued by Henry A. Dreer, Philadelphia, giving the essential directions for vegetable gardening in winter, and explaining how to make the most of hot-beds, cold frames and forcing-houses in order to raise all the ordinary garden crops for home use or for market. The book is clearly written and well illustrated by reproductions of photographs. It contains something like ninety pages, and costs only twenty-five cents.

Akebia quinata is one of those climbers which holds its foliage fresh and green long after freezing weather has set in, so that wherever a screen is needed it is one of the very best of plants to use. Its beautiful five-pointed leaves persist nearly all winter in sheltered places, so that it is practically an evergreen in such situations. The foliage starts early in spring, and the oddly shaped chocolate-colored flowers are very interesting. In short, few climbers have a greater number of good qualities.

Mr. Eckford, who has produced so many interesting varieties of Sweet Peas, is offering his novelties for the season of 1897 at twenty-five cents a packet, instead of sixty cents for a packet of twenty seeds. Many enthusiasts in the cultivation of Sweet Peas have been disappointed at the weakness of some of these high-bred seedlings and at their lack of distinctness when compared with other varieties, and a decreased demand may be one reason for the reduction; but, no doubt, another reason is that California has such a favorable climate for growing Sweet Peas that a large stock of any novelty can be quickly worked up on our Pacific coast.

The last number of *The Gardeners' Chronicle* which has reached us gives a portrait of the inflorescence of *Camoensia maxima*, the noble tropical climber which Mr. Watson reports in his London letter in another column of this journal, as flowering simultaneously at Kew and in two private gardens in England. The large milk-white petals with their frilled edges of gold are of thin texture and therefore quite fugacious, and the ornamental rim soon turns to a dingy brown. Of course, the flower has less value in the gardener's eyes on account of these circumstances, but as they appear abundantly in clusters and open in succession, a large plant in bloom is a striking object and justifies the eulogium which Welwitsch bestowed upon it as he saw it growing in Angola.

Roman Hyacinths and the Paper-white Narcissus are just beginning to appear in the decorations of the florists' windows, which have been unusually beautiful during the Chrysanthemum season now passing away. Of course, there will be Chrysanthemums in the market until the holidays, but it is evident from the appearance of the flowers that a great majority of them have passed their prime, and they have lost the crisp look they wore a week ago. The season has been perceptibly shortened by the high temperature and bright sunshine which prevailed during the early part of November. Of the varieties used for show purposes in the windows, Maud Dean has been the favorite, while the new Rose, *Souvenir du President Carnot*, is also used in almost every shop in the fashionable quarter of the city, primarily because it is new, perhaps, but it seems to be considered by the florists a variety of much promise. A western correspondent writes us, however, that this Rose, as shown at the St. Louis exhibition, was not very favorably received. It was criticised for a lack of decision in color and of fullness in flower.

Writing of the autumn colors of certain plants, Mr. Joseph Meehan says that *Vitis Coignetiae*, which turns to such rich autumnal colors in its Japanese home, and which in some parts of the country has lived up to its reputation, has failed altogether to show any beauty in its foliage at Germantown. The leaves behave exactly like our own fruiting Grapes—that is, they turn brown and fall to the ground. Mr. Meehan also has a good word to say of our somewhat neglected *Rhus (aromatica) Canadensis*, which is so useful where a low growth is needed. It changes to beautiful colors in mid-November after the leaves have fallen from all our other Sumachs. The Asiatic *Rhus semialata Osbeckii* does not color at all in Germantown, although its autumn foliage is said to be beautiful in Japan. We may add that in this vicinity its leaves turn brown, or, rather, shrivel up, and fall so early that one suspects that they are preyed

upon by some fungous disease. Its large, cream-colored flower-clusters, which appear very late in the season, give it some value at that particular time, but there are many more desirable trees.

Considering the large importations of Jamaica oranges which have been selling slowly and at a loss almost all of the season, the untimely haste of California orange growers in shipping their fruit east seems unwise. The idea of the California growers appears to be that the loss of the Florida crop has made a scarcity which has not been supplied. There has been intense rivalry in the orange-growing sections of California in the matter of making the earliest shipment, and the first car-load was forwarded from the foot-hills near Glendora, in the southern part of the state, on November 8th, and from Porterville two days later, with shipments to follow daily. Recent rains and cool nights are said to be favoring the ripening and coloring of the fruit, but there can be little doubt that these oranges are not matured and properly ripened and that the fruit is thus at a disadvantage. Florida oranges are now regularly in trade here, consignments of several hundred boxes having been received during the past few weeks, besides a car lot. The crop of that state is estimated at 125,000 boxes. From Jamaica 127,784 barrels have already reached this port, besides Mexican oranges, the first car-load of which was sold here last week. New Messina and Valencia oranges are already on the way to this country, these shipments marking the opening of the season for Mediterranean oranges.

The displays of vegetables for the Thanksgiving season, while not unusual in any respect, are not only varied and beautiful, but instructive, as showing the resources of the country at this season, for almost all the offerings are from the United States. Hot-house tomatoes, from Pennsylvania and Massachusetts, sell for thirty-five cents a pound, and these are now supplemented by the field-grown product from Key West, which brings twenty cents a pound. Selected Florida cucumbers sell readily for five cents each, and perfectly grown ones from hot-houses near Boston, where the cultivation of this vegetable is a specialty, cost ten cents. Eggplants, from the south, are less plentiful than they have been, but can be had for fifteen and twenty cents apiece. Cauliflower, owing to the open season, is abundant and excellent in quality, and ranges from ten to twenty-five cents each, according to size. Celery, from near-by points, western New York and Michigan, is within easy reach of buyers, costing forty cents to \$1.00 for a dozen stalks. String-beans, from South Carolina, Georgia and Florida, vary largely in quality, and consequently in price; bright fresh wax-beans, carried by express, bring fifteen and twenty cents a quart. Peas have advanced in price on account of recent frosts, some shipments from Virginia having been badly frozen. The best cost seventy-five cents a half-peck. Pumpkins prove perishable in the dealers' hands, and are kept with difficulty beyond this time of year. Those now in stock cost twenty to forty cents each. Hubbard and Boston Marrow squashes, from this locality, cost ten to twenty cents each, and white summer squashes, from Florida, ten to fifteen cents. Other staple vegetables, cheap and plentiful, are parsnips and carrots, which cost twenty cents a dozen, and oyster-plant, ten cents a dozen. Potatoes are in large supply, but the quality is said to be under the average, much of the stock being rough and coarse. Choice smooth varieties, in sound condition, bring thirty-five cents a peck. Sweet potatoes, from Virginia and New Jersey, sell for twenty-five cents a half-peck. Red and white onions cost seven to ten cents a quart, and the large sweet Spanish onions, sixty cents a dozen. Jerusalem artichokes find slow sales at fifteen cents a quart. The true and more highly appreciated artichokes now coming from France maintain the uniform price of twenty-five cents apiece. A vegetable offered now by some of the best greengrocers, and a comparative rarity here, is the cardoon, the stalks of *Cynara Cardunculus*, originally from southern Europe. While not largely cultivated in England or America, this vegetable is highly esteemed on the continent of Europe as a wholesome esculent; the blanched stalks and inner leaves are prepared as asparagus is, or used for salads and in soups. The tall plants cost seventy-five cents each. Okra, from Louisiana and Florida, may be had for fifty cents a hundred, and peppers, from the south, at forty cents a dozen. Turnips, white and yellow, cost twenty cents a half-peck; domestic Brussels sprouts, fifteen to twenty cents a quart, and those from France, twenty-five cents a pound; beets, five cents a bunch, and cabbage, ten cents a head. Radishes, parsley, chervil, chives, mint, watercress, horse-radish, escarolle, corn salad, lettuce, spinach, kale and curled endive, sold as chicory, are included among greens and condiments in season now. Cranberries cost fifteen cents a quart.

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Pruning Shrubs.

EVERY year, and often in the course of the year, as a rule, we have inquiries as to the proper method of pruning shrubs, and we have explained more than once the best practice as fully as was possible in a brief compass. Nevertheless, continually recurring inquiry deserves repeated answers, and, although we have nothing new to say, it may not be amiss to discuss the subject briefly once more. It is a hopeful sign for American gardens that the use of deciduous shrubs has increased so largely within a few years. Our climate is peculiarly favorable to the growth of flowering shrubs, and when we learn to give them deep rich soil and cultivate them as they deserve their value will be more generally appreciated. As far as pruning is concerned, the most cruel way to treat them is to turn an untrained laborer loose among them and direct him to "trim them into shape." Sometimes the man-of-all-work will shear every one off at an even height, like the top of a hedge, or he will aim to get every one into the form of a cone or hemisphere, his idea of beauty being that every shrub should be shaped exactly like its neighbor. Of course, each plant to be at its best should develop its special graces in the line of its natural growth, and this primary law is defeated in shrubbery where every individual is cut to one pattern. This formal shearing not only destroys the shrub's beauty of outline, but it lessens the power of the plant to produce flowers and fruit and weakens its constitution.

There are two or three elementary rules which are to be observed when the production of flowers is primarily desired. Shrubs which blossom early in the spring form their flower-buds the year before and ingeniously protect them during the winter with a warm covering, so that they are ready to open with the early days of spring sunshine. Any one who will cut off the twig of a Peach-tree in the winter or of an early-flowering Spiræa and put it in water will understand this, for the flowers will expand in a few days after it has been brought into a warm room. Obviously, if the branches of such shrubs are cut hard back in autumn, all the flower-buds are cut away and there is no bloom in the spring. If, however

the branches are cut back immediately after the flowering season is over, this will encourage the growth of new shoots from buds near the base of the branch and these will grow rapidly to take the place of the part that has been lost and cover themselves with flower-buds for another year. Another class of shrubs, like the Hydrangeas, Althæas and certain Tamarisks, which flower in late summer or autumn from buds which have developed on the wood grown during the current summer, should be pruned in late autumn after flowering or, at least, before the wood starts in the spring, so as to encourage abundant summer growth and flower-buds for the next autumn. But these are the simplest elementary rules and relate solely to the production of flowers. Shrubs are useful for many other purposes than merely to display their blossoms. They are beautiful all the year round. Even in the winter the variously colored barks of many of them add a singular charm to the landscape. We, therefore, prune them, not only to promote the production of flowers, but of wood and foliage and fruit as well, to insure grace or symmetry of outline, and to make them vigorous and healthy.

The simple cutting in of flowering wood in spring or fall is thus a small part of the art of pruning, and where there is a large variety of shrubs there is no time of year when something in this direction cannot be done, and it is especially useful when it is continued throughout the entire growing season. If surplus wood is to be removed, a clean cut in midsummer will heal over much more readily than it will in cold weather, and there is no better time for removing superfluous branches or for shortening in over-vigorous shoots which interfere with the symmetry of a specimen. Some trees and shrubs whose branches bleed when cut in spring will heal over quickly if pruned while in full leaf. If the strong branches are pinched back in summer the wood will ripen into such a sound condition for withstanding cold that trees naturally tender have been known to endure our winters fairly well when their branches had been properly stopped. This summer pinching is especially useful in wet seasons, when otherwise the wood keeps growing late in autumn and is caught by freezing weather in a soft and sappy condition. It also discourages upward growth where this is undesirable, and tends to develop fruit-buds, so that shrubs and trees will bear fruit at an earlier age when they are properly pinched back. For the same reason shrubs will ripen their fruit more perfectly when the stronger shoots above it have been stopped.

Just how much to cut is a matter to be learned by experience. Sometimes the best way to renovate a shrubbery is to cut many of the plants to the ground and let them start anew. In others a very severe pruning is often advisable. If every annual shoot of the large-panicked Hydrangea is cut back in autumn or early spring to a couple of eyes the growth next year will be very vigorous, and even after the new shoots start, if all the weaker ones are rubbed out, enough will remain, each one carrying an immense flower head at its extremity, to completely cover the shrub with bloom. But it should not be forgotten that too much pruning weakens plants. When florists began to sell long-stemmed Roses they soon discovered that they were selling the vitality of the plant as well as the flowers, and they learned to give a long period of rest to the weakened plants which were to produce another crop, so that they might recuperate their exhausted energies. Every one has observed how abundantly the foliage starts out from the stump of an amputated branch of a Silver Maple, for example, but this is not a proof of increased vigor. In reality it is a signal of distress, and shows that the tree has aroused itself to an extra effort to supply the places of the organs of nutrition of which it had been robbed. A young plant carefully pruned when it is set out in good ground, with room enough to grow in, will sometimes need, as it grows, to have interior branches cut away for the admission of light and air, and the over-strong shoots pinched backed in midsummer and dead wood carefully removed.

Little more will be required, as a rule, except to shorten in judiciously the flowering wood after bloom, and under this treatment shrubs will develop into their best form and flower abundantly year after year.

An instructive paragraph in the forthcoming report of Secretary Morton refers to the gratuitous seed-distribution by the Government, which he had attempted to regulate and place on a rational basis in accordance with the purpose of the law as it was originally enacted. Unfortunately, his good intentions were thwarted by Congress, and he reports that for the year ending in June he has contracted for seed to the value of \$130,000. Prices were low last year, but they are still lower this year, so that the quota of each Congressman will be double what it was in the year 1896, and will contain enough seed to plant about three hundred acres instead of 163½ acres, as was the case last year. Careful estimates show that at retail-price valuation these seeds would amount to more than two million dollars, and it is no wonder that the retail seedsmen of the country made an effort by injunction to prevent the Department from purchasing seed to be used in competition with their business. This injunction, however, was denied, and thus, as the Secretary remarks, the great privilege of gratuitously furnishing garden and flower seeds to a small per cent. of the people out of the money raised from the revenue of all the people is preserved by the members of Congress and the officers of the Department of Agriculture. Of course, there is no more reason why Congress should scatter seed around in this loose way than there is for distributing flannel shirts or liver pills or stove polish. But, nevertheless, the seed distributed this year will be sufficient to plant 230 square miles of ground, and will, therefore, employ in its distribution sixty mail cars. Last year the seed would have planted a strip of ground a rod wide and more than 36,000 miles in length. This year the increased appropriation would plant a strip of this width which would reach three times round the globe, and the cost of carrying this four hundred and odd tons of seed through the mails will be something like \$150,000. We unite with the Secretary in regretting sincerely this unnecessary and wasteful expenditure of public money. It is a national disgrace that Congress does not put a stop to the wretched business.

The Study of Varieties of Fruits and Vegetables.

IN connection with the criticism upon Variety Tests at the Experiment Stations, which appeared in a recent editorial in GARDEN AND FOREST, I should like to call attention to two ways in which a garden collection of the varieties of a cultivated species may be used with profit.

First, in tracing the progress that has been made in improving the species during a given period, such a collection is indispensable. The importance of knowing just how a species is inclined to vary, and what value has been placed on certain variations that have occurred, is apparent when questions relating to the further improvement of the species are considered. This is especially true when these values have been passed upon by a jury of thousands of competent gardeners and their customers. As the birth-rate of new varieties in the trade greatly exceeds the death-rate of the old, it is possible to bring together in a garden collection about all of the varieties of a particular fruit or vegetable that have enjoyed any degree of popularity during a period of fifty years or more. And in the absence of both exact descriptive literature and museum specimens we must go to such a collection in order to compare what are considered the most highly developed forms of a species at the present time with those that were considered the best, five, ten, twenty or fifty years ago.

Second, in sifting out the less important singularities of the different sorts from what may be termed the specific traits of the cultivated form of the plant, the garden collection of varieties can furnish information that is not obtain-

able elsewhere. In making generalizations concerning such matters, as the disorders to which plants of a species are subject, or the atmospheric or soil conditions that are either favorable or antagonistic to the performance of the vital functions of the plants, it is important that one should not be misled by varietal eccentricities. The popularity of varieties is often of short duration, and it is in no wise certain that the successor to the variety of any fruit or vegetable that is looked upon most favorably at the present time will be an offspring of that variety, or even of the parents of that variety. It may come from quite a different branch of the species. Consequently, a comprehensive study should include the distinct forms, and so far as all of the varieties have traits in common, these may be considered in generalizations relating to the species as a whole. Varietal peculiarities which are of a less permanent character should not materially influence such generalizations, but be associated with the variety or varieties to which they belong.

Rhode Island Experiment Station.

L. F. Kinney.

A Cañon near Ukiah.—I.

UKIAH VALLEY is the bed of one of an ancient chain of lakes which formerly extended along the upper course of Russian River, in the heart of the Coast Range of northern California. By a process of silting on the one hand and cutting down their outlets on the other, these lakes had, at the time of the first white settlements some forty years ago, been reduced to mere ponds, which were soon drained. In the table-lands about the foot of the steep surrounding mountains the banks of the old lakes may be seen, while their beds are rich alluvial lands. Ukiah valley is eight miles long, with an extreme width of three miles. On the east and west it is hemmed in by high ranges which rise to twenty-three hundred feet above the sea and seventeen hundred above the floor of the valley. The range to the west is abrupt in ascent and deeply cut by great cañons, or gorges as they would be called east of the Rockies, down which in winter torrential streams flow, while in summer there are living streams fed by springs. Here, as well as elsewhere in California, almost all of the precipitation of rain is between October and April. During that period from thirty to fifty inches fall, while between May and October scarcely enough falls at any time to lay the dust. Each of the cañons of this section has its distinctive features, dependent on soils, slope, exposure, moisture, and the angle at which the sun strikes it. In the Sierras large areas have substantially the same soil and support about the same class of vegetation. In this part of the Coast Range the soils change at short intervals sufficiently to affect vegetable life. The mountain regions have been so torn by upheavals, landslides and the action of heavy rainfall, that the soil is hardly the same in any two consecutive spans of a hundred yards each.

The mountain west of Ukiah marks the most distant point from the ocean reached by the Redwood forest. A few of these trees are found on the edge of the valley, others are scattered along the mountain streams, and on cool slopes there are a few small groves, but on the east side of the valley not one is to be seen. For fifty miles north and south the same condition exists. Even where the Russian River is narrowed to a gorge, and Redwoods dip their branches in its water on the west side, not a single tree has crossed the stream. All of the trees which are its attendants, except the Tanbark Oak, *Quercus densiflora*, are found in abundance on the east side of the river and chain of valleys.

One of the most beautiful and varied of the cañons on the west side debouches into the valley about a mile below Ukiah, and is locally known as Doolan Cañon. For a half mile before it enters the valley its floor is a vale a few hundred yards wide. Starting from the stream the slope is at first gentle, but quickly changes to abrupt hillsides, which rise to high headlands on either side. A beautiful

mountain stream has formed tiny alluvial flats, in which California Laurels and Alders luxuriate and have grown to great size. Here and there are groves of Redwood, the trees fifty to seventy feet high, straight and beautiful. They seem at first to be seedlings, but examination shows the stumps of big trees which were cut in the "fifties," and around each is a grove of sprouts. I know of no finer place to find the rate of this second growth, and hope to give measurements from these groves later on. In places the Wild Grape has overgrown Alder, Redwood and Laurel so completely that scarcely a leaf of the host can be seen. At all times when in foliage these masses of vines are striking, but in the fall the color of the leaves is gorgeous and there is nothing in our woods to equal their brilliancy.

The headland on the south side of the cañon is densely clothed with trees. On the cool slopes the Black Oak, *Quercus Californica*, predominates, but Douglas Spruce and Madroña are abundant and their evergreen habit prevents the woods from ever seeming bare. The timbered land extends less than half a mile up the slopes to the south and then gives way to a dense and practically impassable mass of trees from fifteen to thirty feet high, mingled with tall shrubs, all in the greatest variety. The Mexican name for this dense growth is Chapparal, and by that name it is known throughout the state. It covers millions of acres of the high slopes on the north sides of the mountains of the Coast Range. The mountain sloping to the north of the cañon, and facing south, is grassy, with scattering trees, mostly Post Oak, *Q. Douglasii*, a deciduous Oak with small lobate leaves and white bark. It thrives in hot places and dry lands, and usually forms a small tree, although occasionally three feet through. At less than half a mile from the stream the grass and trees give way to the Chemise or Chemise Brush. Imagine slope after slope, hill after hill and mile after mile of low dense brush of a uniform blue green, which from the valley seems as smooth in outline and as close-cropped as a lawn, and gives to every mountain the same rounded outline, and you have Chemise Brush, *Adenostoma fascicularis*. This in winter. Imagine the same soft monotony of color and outline, with only a little more tawny a shade given by its dried-up flowers, and you have the appearance in summer and fall. Close at hand, Chemise is fully as dense, but not nearly as smooth, as it looks from a distance. Covering nearly all of the higher mountain of the east half of the Coast Range it is a world of itself and deserves separate treatment.

An old sled road, made by the pioneers who cut the Redwoods so long ago, leads up the cañon. In some places it is overgrown, in others washed away, but a good walker can follow it, and if he loves nature he will be well repaid in any season, for between the high slopes of Chemise on the one side, and of Chapparal on the other, is enclosed a floral treasure-house, richer from the impassable surroundings. I have loved and traversed this cañon for years, yet on my last trip I found a beautiful spot of whose existence I had never dreamed.

In the early spring the first flowers show in the warm Oak woods. The very earliest is *Cardamine pausisecta*, with beautiful leaves purple beneath, and fragrant white flowers. It is soon followed by our Cowslip. The form here is *Dodecatheon Hendersonii*, which, to my eye, is prettier than the much praised *D. Clevelandii* of the south. It is especially abundant at the edge of the Chemise Brush and in any little open place in it, and forms large beds. The plants which the children call Chocolate Lily, and which botanists know as *Fritillaria lanceolata*, grow freely in the Oaks and flower in late March. Its graceful habit atones to some extent for its dull flowers. It has been remarked that it should be grown with the waxy-white bulb in the air, for this is covered thickly with pearl-like grains and is really beautiful. Soon, Buttercups, *Ranunculus macranthus*, the *Nemophilas* and a multitude of other plants follow in the midspring bloom. Up this little gully shaded by Live Oaks and Spruce, on a rocky ledge among the Fern

and Poison Oak, are thousands of Dog-tooth Violets, *Erythronium giganteum*. The recurving petals measure two to two and a half inches across, creamy yellow in color, with an orange centre, and occasionally banded with maroon. The leaf-mold which has gathered in the rocky debris quite meets the needs of the plants.

In their seasons two Irises beautify the cañon. In the gritty soil of the Oak woods along the warmer part of the cañon and among the Manzanitas of the warm south slopes *I. macrosiphon* grows in abundance, and it seems to thrive in the hottest and driest places. It forms large clumps of hundreds of plants, the wiry rhizomes spreading until, in some cases, the dense clumps measure three feet across. It flowers in May and June, bearing many small but handsome flowers in shades of blue, lilac and purple. *I. Douglasiana* is quite different. Its home is where the little vale ends by the steep cañon-sides. There in the deep and rich debris which has accumulated at the foot of the slopes it is at its best. Its leaves are long and glossy, the mats not crowded, and frequently few-stalked. The base of the leaves is rosy. Its exquisite flowers are large and few, borne well up, the ground-color creamy or ochre, with purple veining, the texture heavy and exquisitely frosted. I have seen no Iris to equal them in beauty. They grow even better in my Fern-bed than in the woods.

Ukiah, Calif.

Carl Purdy.

Foreign Correspondence.

Edinburgh Botanic Garden.

A BOTANIC GARDEN was founded in Edinburgh in 1670 by Doctor (afterward Sir Andrew) Balfour. Mr. James Sutherland was the first Curator and Professor of Botany, and, according to a catalogue prepared by him in 1683, there were some three thousand species of plants cultivated there. This garden has long since disappeared, the site being now occupied by the North British Railway. A second garden was established in Leith Walk in 1763, but this grew to be unsuitable, and in 1819 the present site in Inverleith Row was purchased. At that time the gardens were about fourteen acres in extent. By 1870 the area had doubled, and at the present time the garden occupies about fifty-five acres of uneven ground about two miles from the centre of the town. In 1889 the Edinburgh Garden was included in the Royal Parks and Gardens, under the management of the Commissioners of Her Majesty's Works and Public Buildings, and was thus placed on all fours with Kew as a national establishment, supported by public funds. It has an annual grant of about £4,500, and has a Director, styled Regius Keeper, curators, etc. It differs from Kew in being an adjunct of the University of Edinburgh, and large class-rooms, laboratories, museums, etc., are devoted to the teaching of botany to from two to three hundred students. It also possesses a large herbarium and a well-stocked library.

Professor I. Bayley Balfour, the present Director, has done much to improve the gardens both in a popular and a scientific sense. The grounds have been remodeled and the collections of trees, shrubs and herbaceous plants strengthened and rearranged. The old glass houses have nearly all been replaced by new and admirably planned structures of the most approved pattern, and the museum collections overhauled and set in order.

An excellent library and reading-room has been provided for the use of the garden staff. The active, energetic spirit and enthusiasm of the Director pervades the whole establishment, and any one who knew the Edinburgh Botanic Garden ten years ago cannot fail to notice the great improvement that has been made since that time. The Government authorities have been liberal in granting funds for the required alterations, some £10,000 having been spent in new works, and about another £5,000 will be needed before all that is contemplated is accomplished.

The alpine collection and rock garden at Edinburgh have

always been famous for extent and excellence of cultivation. This is partly due to the favorable character of the climate. The rockery is not picturesque, but it provides accommodation for an enormous collection of all kinds of choice plants, and therefore serves the main purpose of such a structure. It occupies a slope upon which mounds have been thrown up and the stones arranged somewhat formally, so as to provide about four thousand pockets. Such genera as *Primula*, *Veronica*, *Silene*, *Gentiana*, *Sempervivum* and *Saxifraga* are very largely represented. Dwarf trees and shrubs are planted here and there among the stones. The herbaceous plants are arranged similarly to those at Kew, namely, in long narrow beds running parallel to each other on a lawn in an open part of the garden.

Among the trees *Coniferae* are the most noteworthy, while the collection of *Ericaceae* is exceptionally rich. A small pond for aquatics is as remarkable for the large collection of plants it contains as for its inartistic shape. The new plant-houses are excellent in design and they are stocked with collections of well-grown plants of all kinds, from succulents to economic plants, from Orchids to Ferns; long corridors filled with climbers, and from one side of these start houses at right angles, the sheds, etc., being on the other side. The old Palm-house has been greatly improved by pulling out the sides, and all round it is a sloping annex. This has resulted in a house exceptionally well adapted for the cultivation of all kinds of tropical plants, and although it is only about two years since the alteration was made the contents of the house are generally splendid examples of good cultivation. With the exception of a shelf extending all round the side of the annex for the accommodation of pot-plants, the whole of the space is occupied by beds of soil in which the plants are planted. Numerous successes have already been achieved in this house in the flowering of rare plants and the robust growth of recalcitrant ones. The roof is furnished with a large collection of climbers, all luxuriating as a gardener loves to see them. *Combretum purpureum*, *Odontadenia speciosa*, *Camoensia maxima*, *Momordica mixta*, *Corynostylis hybanthus*, *Ipomoea Horsfalliae* and *Aristolochia gigas* are specially noteworthy. Cycads of all kinds appear to delight in being planted out, while such plants as *Randia maculata*, *Rudgea macrophylla*, *Napoleona cuspidata*, *Coccoloba pubescens* and *Acacia sphaerocephala* have grown with a luxuriance never seen before. In one of the large greenhouses *Restio subverticillatus* is represented by a magnificent specimen ten feet in diameter, the horse-tail-like stems being seven feet long. *Gleichenias*, in the same house, are equally remarkable for size and vigor.

Orchids, of which the collection comprises about nine hundred species and varieties, are generally in good condition. The collection of *Masdevallias* formed by the Marquis of Lothian, while preparing his monograph of the genus, has now become the property of the Edinburgh Botanic Garden. *Begonia President Carnot* planted out, the stems trained against the roof-glass in a warm house, has grown to a large size and in October bore pendent heads of rich rose-red flowers nearly a foot in diameter, the leaves being about a foot long. *Nepenthes*, *Droseras*, *Darlingtonias*, *Sarracenias* and other insectivorous plants are a special feature in this garden. *Disa grandiflora* also grows as freely as on Table Mountain, and *Ouvirandra fenestralis*, grown in a tub in a shaded position, was crowded with big leaves and was in flower. A second large house, originally built for Palms, is now used as a temperate house and contains large specimens of Australian trees, Palms, Ferns and *Coniferae*. *Chamaerops Griffithiana*, thirty feet high; *Livistonia Sinensis*, fifty feet; *Dacrydium cupressoides*, forty feet; *Rhopala corcovadense*, twenty feet, and a unique specimen of a *Podocarpus ferrugineus*, with long drooping whip-like branches, are among the noteworthy plants in this house. It is intended to attach a sloping annex to this as to the tropical Palm-house.

A house filled with succulents, all the large specimens of which are planted out in a bed of light soil, is an important

feature. Large plants of *Cereus giganteus*, *Echinocactus Wislizeni*, *Opuntia imbricata* and others imported from Arizona are growing most vigorously under the liberal treatment afforded by the planting-out system.

The planting out of all the larger plants in preference to growing them in pots is a new departure in botanic-garden culture, and it is being watched with interest by all who are concerned with the cultivation of plants under glass. So far it has proved an unqualified success. The only possible objection to it is that it rushes the plants, as it were, into a luxuriance which is not easily controlled, so that they soon become too large for their positions. On the other hand, the plants are seen at their best when treated in this manner, and I would rather enjoy a healthy specimen for two years than put up with a miserable half-starved scrag of a plant for twenty. If a succession of young plants is kept up, so that overgrown specimens may be rooted out and replaced, the results of this planting-out treatment must, on the whole, be far preferable to pot-culture. There is a great deal too much stage and flower-pot in indoor gardening as practiced nowadays.

London.

W. Watson.

New or 'Little-known Plants.

Aspidium simulatum, Davenport.*

THIS is another New England Fern, new to botanical science, for which we are indebted to the acute observations of Raynal Dodge, who first brought it to the notice of Professor Eaton and myself. That it should have escaped attention so long as it did is undoubtedly due to the fact that no one supposed it possible to find a new Fern within the limits of an area so thoroughly worked over as that of Gray's *Manual* was supposed to be, and if in any instance it did attract attention it was in all probability looked upon merely as a form of *Aspidium Thelypteris* or *Noveboracense*, with which it nearly always grows. Once recognized, however, it is quickly seen to be entitled to specific recognition, and one wonders that it did not sooner arrest the attention of some of the older botanists who were generally keenly alert for new forms and quick to recognize them.

The frequency with which this Fern has been collected since its publication, only two years ago, shows that it is by no means uncommon, and that it is likely to be found abundantly over a wide area of distribution, and also shows that it will not always do to take it for granted that the resources of any given area are exhausted, however carefully it may have been worked over.

Unlike *Aspidium Thelypteris*, which prefers the partially open to deep shade, this plant loves the shade and moisture of cool hummocks in deep woods and swamps, thriving vigorously fertile where *A. Thelypteris* is invariably flaccid and sterile.

The finest clumps of *Aspidium simulatum* that I have anywhere seen were growing on large hummocks in a submerged swampy woodland on Indian Point, Maine, with the tall, fertile fronds overtopping the sterile half their own length, and from three to three and a half or more feet high. They had the hummocks all to themselves, and it was a most beautiful sight to see hundreds of these tall, gracefully waving fronds rising to the height of the *Osmundas* near by, and far surpassing them in that gracefulness of form and presence which lends so great a charm to many other of our native Ferns.

Aspidium simulatum is seldom found growing in the open, except where the woodlands have been cut off, leaving its natural habitat exposed to the direct rays of the sun, when it takes on a more contracted form with conduplicate pinnæ, and exactly simulates the narrow form of *Asplenium Filix-foemina*, which suggested its name. Plants of these two forms growing side by side in my garden so closely resemble each other in every way that, although

* *Botanical Gazette*, vol. xix., p. 495, December, 1894.

Fig. 69.—*Aspidium simulatum*, Davenport.—See page 484.

1. *Aspidium simulatum*, two-thirds natural size. 2. Portion of frond grown in the sun, two-thirds natural size. 3. Pinnules, enlarged. 4. Indusium, enlarged.
 5. Root-stock of *Aspidium Thelypteris*. 6. Root-stock of *A. Noveboracense*.

belonging to two entirely distinct genera, they cannot readily be distinguished from each other by any merely superficial examination. Small plants of *A. simulatum* growing near the borders of low woodlands also closely

resemble plants of *A. Filix-fœmina* growing under similar conditions, the outline of the lamina in both Ferns being almost identical.

If we compare *Aspidium simulatum* with *A. Thelypteris*

and *A. Noveboracense*, to which it is most closely allied, we find the following essential points of difference and agreement between them :

First. The root-stocks of all three species are similar in character, being long, cord-like rhizomes, wide-creeping and forking, with these differences : that in *Aspidium Thelypteris* the rhizoma is black, or nearly black ; it branches more freely, and the stipes are farther apart than in either of the other two species. In *A. Noveboracense* the rhizoma is brown in color, and the stipes are closer together along the lengths than in *A. Thelypteris*, and form cæspitose crowns at the growing ends. In *A. simulatum* the rhizoma is light brown in color, with the stipes still more approximate, and forming more frequent and more compact crowns than in *A. Noveboracense*. The bases of the stipes are persistent in all three species, remaining attached to the rhizoma over from one season to another, or until they wholly wither away.

Second. In *Aspidium simulatum* the stipes correspond in proportion to those of *A. Thelypteris*, being usually about one-half the length of the entire frond, whereas in *A. Noveboracense* the stipes are very short, on account of the lower pinnæ being gradually reduced in length downward along the stipe toward its base where they become mere auricles, a character which prevents any comparison between it and the others ; but if there is any material difference between the stipes of *A. Thelypteris* and *A. simulatum* it is in the lighter color and greater flexibility of the latter, a character which gives to *A. simulatum* when growing more of the habit of *A. Noveboracense*.

Third. A noticeable character in the fronds of living plants of *Aspidium simulatum* is the peculiar standing forward of the lowermost pinnæ, just as is seen in *Phegopteris polypodioides*. In pressed specimens these show as if deflexed. The same thing occurs frequently in fertile fronds of *A. Thelypteris*, but in *A. simulatum* it is seen in both fertile and sterile fronds. The same is true also of the woodland form of *Asplenium Filix-femina*, to which I have already alluded as being similar in outline to *A. simulatum*.

In summing up the superficial characters of *Aspidium simulatum*, we find that it may be readily distinguished from *A. Noveboracense* by its longer stipe, introrse lower pinnæ, and often by the conduplicate pinnæ of the fertile fronds—the fronds themselves being more or less pubescent, the margins ciliate so ; and from *A. Thelypteris* by its simple veins, larger sori, glandular indusia and less convolute margins of the fertile pinnæ. This species develops later in the spring and continues green longer in the fall than either of the others.

Mr. Faxon's drawing (see p. 485) well illustrates the different characters to which I have here called attention, but for more specific details see *Botanical Gazette* for December, 1894.

The species was first collected at Poplar Bluff, in southeastern Missouri, by George W. Letterman, as long ago as August 15th, 1875, but was confused with *Aspidium Thelypteris*, and a specimen which I have seen from that collection is now in the herbarium of the Shaw Botanic Garden in St. Louis. About 1880 Mr. Dodge collected it in Seabrook, New Hampshire, and subsequently in Essex County, Massachusetts, in several places up to 1892, when he submitted it to Professor Eaton and myself for determination. In September, 1889, Judge J. R. Churchill collected it in Purgatory Swamp, Dedham, Massachusetts, a specimen from his collection being at that time referred to *A. Thelypteris* by myself.

In August, 1893, and again in June, 1894, I found it abundant on Indian Point, Georgetown, Maine, and in 1895 Merritt L. Fernald also collected it in Georgetown. In September, 1893, Mr. Dodge and myself made collections of it on the Salisbury marshes, and in Small Pox Woods, Salisbury, Massachusetts, and September 3d, 1894, I found it quite abundant in a deep swamp in Quincy, Massachusetts. It has also been collected at West Roxbury, Massachusetts, by Mrs. M. L. Stevens, Miss Stiles and Mrs. P. D. Richards ; in Needham, Massachusetts, by Mr. T. Otis Fuller ; in Walpole, Massachusetts, by Mr. H. A. Purdie and Judge Churchill, and it apparently was mixed with *Aspidium Thelypteris* in a collection made in Stoneham, Massachusetts, by E. H. Hitchings, the specimens being now in the Hitchings collection bequeathed to the Appalachian Club. Mr. C. E. Waters, of Johns Hopkins University, found it abundant at Sawmill Pond, Ann Arundel

County, Maryland, October 1st, 1894, and September 24th, 1894, Mr. B. F. Bush collected it for *A. Thelypteris* at Sapulpa, Indian Territory, one specimen being now in the herbarium at St. Louis, and one in my own possession.

It will thus be seen that the species has already established for itself a wide range, and that it is apparently a very common American Fern, but whether strictly so or not remains to be seen. It might be well, however, for European botanists to search for it in the haunts of *Aspidium Thelypteris* or among their herbarium specimens of the latter.

Medford, Mass.

George E. Davenport.

Cultural Department.

Greenhouse Notes.

AFTER the Chrysanthemum feast there is apt to be something of a famine in the way of flowers for cutting purposes, and it requires much forethought to avoid this. It has been for several years our practice to have the first crop of Carnations come in at this particular time, and with this end in view the plants are topped in the field later than is generally advised. The last flower-stems are taken off the second week in August, so that at lifting-time in September there is not a flower-stem visible, and the full crop comes on soon after the plants are established in the house. While it is a large crop, it is not more than the plants can perfect easily. When plants are lifted with flower-buds in quantity, the check incident to transplanting frequently makes the task too great for the plants, and if the flowers do develop it leaves the plants in an unfit condition to produce another crop until late in winter. If the first flowers are now picked there will be no scarcity of them through the rest of the winter. For early use all the largest and most advanced plants from specially early propagation are allowed to develop their buds, and are placed in deep frames in July, and these give an abundance of good Carnations for early use, and may be now placed indoors to take place on some of the Chrysanthemum benches.

Poinsettias are useful from this time on until after the new year. If a number are grown it is possible to have a good display at Thanksgiving-time by placing the earliest in a warm house soon after the plants are brought indoors. We have not failed to have them at this time for several seasons. Few plants give such rich coloring now, when bright flowers and foliage are scarce, as well-grown Poinsettias. To keep the foliage in good condition, a temperature of not less than sixty degrees must be maintained, with a liberal amount of stimulant in the water. When cut, the ends of the stems must be immediately placed in boiling water for a second or two. This will stop the loss of sap, and consequent wilting when used for decorating.

Roman Hyacinths are useful now, and may be had with little trouble if good bulbs are obtained. There has been a marked deterioration in the quality the last year or two, for some unexplained reason, but if the bulbs are smaller they admit of being planted closer, and the effect is about the same in the end. It is best to bring them on in a cool house until the flower-buds are visible, otherwise there will be green leaves and very few blossoms. Lachenalias blend prettily with Roman Hyacinths, and are also easily managed. *L. pendula* is the best for this purpose, as it is the most vigorous in habit, the earliest to bloom and one of the brightest in colors, though there are a set of new ones that bid fair to surpass this old kind both in vigor and coloring. Lachenalias must not be neglected after blooming, for the treatment they receive then goes to make the bulb for the following year, and a light position on a shelf in a cool house is easily secured for them. They are Cape bulbs, and need the same treatment as Freesias.

From various experiments it seems that this is the best time to sow Cyclamen seed. A good strain of seeds should be bought and sown in pans of very porous soil as soon as possible. It is some time before the growth is visible above ground, and care must be taken to add plenty of some porous material to prevent the soil from becoming sour and inert. We break up a soft brick fine and use the small siftings. It is the best substitute for charcoal. Water must be given sparingly for a week or two or many of the seeds decay before germinating. Once germinated and the returning increase of sunlight of the new year is upon them, it will be found that there will be no check as when sown in September, and the plants will be much larger than if sown at the beginning of the year. Good strong seedling Cyclamens are in most instances preferable to old bulbs kept over, though it must be admitted that if

these can be kept over and grown they make the best plants. This is not an easy task, however, and seems to be understood by few. In any case, it is well to sow a few seeds each year to anticipate losses.

Where hybrid Roses are grown it is best to bring in a few after the Chrysanthemums are all gone. This is also a good time to buy new plants, when necessary. They should be planted in deep boxes rather than in pots. These new plants must not be forced to come in as an early crop, but kept for later use. It is better if they are allowed to start when they please, and the results for the future will pay for the waiting. When pruning Roses at this time it is well to save the growth which is cut off. If the pieces are cut in lengths of about twelve inches, cut clean at a joint at the base and tied in small bunches with names before they are heeled in soil in a cold frame, it will be found in April that there is a callus at the base of each cutting, only waiting to be planted to strike root and make fine young stock on their own roots at the end of the growing season. When planting the cuttings out it is necessary to bury them deep in the soil so as to leave but one or two joints visible above ground. This prevents too rapid evaporation of the stored-up sap and will greatly facilitate the formation of roots. I regret that we did not save all the prunings last fall when looking at the young Roses raised in this way.

Winter is closing in rapidly now, and the cold frames where the stock plants of Chrysanthemums and other half-hardy plants are stored must be, in this latitude at least, well lined with dry leaves, kept in place by rough boards. Many of these frames will be in demand for use as hotbeds later on, and the protection is then indispensable. All plants that are susceptible to injury from frost should be placed in a heated structure now. With the best care frames are apt to get a little frost at times when the mats are damp or the cold very severe, and many useful things not easily replaced are lost in this way.

South Lancaster, Mass.

E. O. Orpet.

Notes on Roses.

THE stiff-stem fashion has nearly banished the Maréchal Niel Rose from cultivation as a greenhouse climber at the north. Some wonderful specimens of this Rose used to be grown at the Waban Rose conservatories at Natick, Massachusetts, when Mr. E. M. Woods first started Rose-growing. Since under the benching system, with houses of improved construction, more and better Roses can be grown with an almost continuous season of bloom, almost all the older intermittent-flowering varieties have gone out of cultivation. In private gardens, where convenient cross sections afford suitable space, no more useful climber can be planted than this old Rose. Hundreds of fine blooms are cut every year from a plant so situated. The Maréchal Niel is liable to canker, especially when on its own roots, but, so far, our plant, which is now nine years old, has been free from disease. Of the original plant nothing is left but the root-stock, strong shoots from the base having taken its place long ago. In starting a new plant the hardened growth of the original plant should be dispensed with as soon as possible; in fact, close pruning, without regard to an immediate crop of flowers, should be continued a year or two, if necessary, or until a foundation of good, vigorous wood is made. We prune twice a year. Our object originally was by autumn pruning to get a crop of flowers during late winter and on toward Easter-time; by spring pruning in April, to clean out old flowering shoots, reduce the bush to the main stems, and get a fresh growth of strong canes, which would be cut to the amount necessary in autumn again, for another spring crop. But for the last few seasons our plant has bloomed on all summer, not to any great extent, but never at any time have we been without flowers, and some of the finest we ever cut; the stems, in some cases a yard in length, have grown during summer-time.

We often see hybrid Roses offered in the salesrooms, and of late years the department stores have been selling plants cheaply. They are imported stock, and often good plants. There is no guarantee given with the names, and these are frequently incorrect. Whether true to name or not, they are for the most part standard varieties, probably the leavings of the nursery. Since the department stores have been selling this stock a great number of plants have been bought by people having small places on the outskirts of the city, who probably never would buy a plant of a regular dealer. The condition of many of these plants when bought gives little chance of their growing, and, besides this, in most cases so little is known by the buyers of the proper way to treat them after being bought, that

not one in a dozen has a chance for life. To begin with, the big stores make little effort to keep the plants in good condition. I have seen them brought from the city as dry as dust and shriveled beyond hope of recovery. When the packages are opened, plants at all dry should be dipped in water and laid in moist sand (this would be clean to handle), and kept in a cool place until ready for the sale. They would have time to plump up. All plants offered should be kept in moist sand until sold. If nothing better could be done in the way of packing the plants for delivery to customers, a little cheap absorbent paper might be put about the roots as a first covering, and finished on this in the way of ordinary parcels. These simple precautions would place the plants in the buyers' hands with some chance of living.

Roses ought not to be planted until spring. I would rather buy my plants now and care for them myself than trust to a later shipment and find the plants started in transit, which means destruction. I should not do any pruning until time to set them out. Until then they might be kept in boxes, with a little soil about the roots, in a cool cellar, but it is hardly possible that any but a barn cellar would be cool enough. I would rather set the boxes of plants outdoors, where they would not be swamped with thawing snow, and cover the whole lightly with meadow hay, pine needles or stable litter. When spring comes I would prune them and plant firmly, covering the union of stock and scion, or up to the point where the branches diverge.

Wellesley, Mass.

T. D. Hatfield.

Desirable Bulbous Plants.

THE well-known Cyclamen Persicum is one of the best of its class for the greenhouse, and for window culture if properly watered and the room is not too warm. That Cyclamens can be raised from seed and grown on to perfect flowering specimens in a living-room is doubtful; but when grown to flowering size in the greenhouse and brought into the house in bud they will continue to flower for two to three months.

A few nice specimens of *Eucharis grandiflora* and *E. candida* will prove useful in the conservatory, and with little management may be had in flower at almost any season. By successive periods of growth and rest it is not unusual to get two or three crops of flowers from *E. grandiflora* within twelve months, though this is sometimes a strain upon the bulbs. To secure large specimens a number of bulbs should be planted together in a ten-inch pot in a rather coarse compost of fibrous loam, with some peat and sharp sand or crushed charcoal to make the mixture more open, some dried cow-dung and a small portion of bone-dust for fertilizer. After potting they should be kept in a night temperature of about sixty-five degrees and watered rather sparingly until the plants become well rooted. When well established they should be freely watered and syringed. A short season of comparative rest is necessary to secure a good crop of bloom. This can be provided by keeping the *Eucharis* somewhat cooler, and partially withholding water for a time. Care must be taken not to let the plants lose their leaves. Frequent repottings are not needed, but a top-dressing of new soil should occasionally be given, and also occasional waterings with liquid-manure or soot-water.

The hybrid *Amaryllis* (or *Hippeastrums*, as this section is now termed by botanists) include some of the most showy bulbs for the conservatory, and can be readily brought into bloom in succession throughout the winter and spring. They should not be disturbed after the growth is completed for the year, and repotting should be done immediately after the flowers are over, during active leaf and root growth. Good loam, including a little bone-dust, forms a suitable soil, and plenty of water, with a growing atmosphere at about seventy degrees, provides the conditions for rapid progress with these plants. After the leaf-growth is completed, rest is necessary in a low temperature, with only water enough to keep the bulbs from shriveling.

Griffinia hyacinthina, another pretty *Amaryllid*, while long in cultivation, is not by any means common. This plant thrives under similar treatment to that needed by *Eucharis*. Like the latter, it is evergreen, and requires only moderate drying during the resting season. It has broad, dark green leaves, somewhat resembling those of *Eucharis grandiflora*, but more flat and with peculiarly netted veins. The umbel of flowers is thrown up on a stout scape. The individual flowers are about three inches in diameter and pale violet in color.

Some of the *Crinums* and *Pancratiums* can also be used to advantage in the conservatory, and have the additional merit of not needing high temperatures to bring them into bloom. *Crinum amabile*, *C. Kirkii* and *C. Moorei* are among the best,

but, having very large bulbs and luxuriant foliage, they occupy considerable space. The *Pancratiums*, as a rule, are not so large, but produce strong spikes of fragrant flowers, most of the species being white. Neither *Crinums* nor *Pancratiums* are specially fastidious in regard to soil, though responsive to good cultivation, and they absorb large quantities of water while in active growth.

Holmesburg, Pa.

W. H. Taplin.

Yucca Gloriosa.—For the first time, so far as I can ascertain, this plant has flowered perfectly here. It blooms late in the season, and until this year every attempt it has made to flower has been frustrated by freezing weather. This year a slight covering at night has sufficed to protect it against the lowest temperature yet experienced, and for three weeks or more its large panicle of flowers has been a novel and attractive spectacle. The warm weather has permitted every flower to expand, and although it is now (November 20th) past its best, it is still an object of much interest. It has a second branch almost ready to flower, but it is too much to hope for more flowers with winter at hand. I know only one or two more examples of this arborescent *Yucca* in Philadelphia. They are quite hardy here, and, no doubt, if they were planted in a warm, sheltered place the flowers would often expand in spite of their late appearance.

Germantown, Pa.

Joseph Meehan.

Iris macrosiphon.—The experience of Max Leichtlin in growing this pretty *Iris* successfully, as given by Mr. Gerard in a recent issue of *GARDEN AND FOREST*, is valuable to growers. Herr Leichtlin states that at Baden-Baden they start into growth in May. This is interesting as showing how quickly plants adapt themselves to changed conditions. In its native home, here in the northern Coast Range, *I. macrosiphon* lies dormant during the dry, rainless season, from May to October. The first light rains start a root-growth, the old roots pushing out rootlets and new spongy roots forming at the base of the growing end of the wiry rhizome. The leaves soon start. Its growth is here a winter growth, and with its flowering in May begins the ripening, to be followed by the long summer rest. At Baden-Baden it would seem to take a winter rest and make growth in summer. Otherwise, my experience corresponds with Herr Leichtlin's, in that the best time to move the plants is just as they begin to start. Examination of a bed of several hundred collected plants moved October 15th shows that they are now (November 16th) making a vigorous root-growth.

Ukiah, Calif.

Carl Purdy.

Correspondence.

Notes on the Vermont Apple Crop.

To the Editor of *GARDEN AND FOREST*:

Sir,—The American apple crop, taken as a whole, is very large this year; but northern New England seems to have a proportionally larger excess than any other section in Canada or the United States. The crop here is nothing less than phenomenal. The actual commercial crop is probably twice as large in the apple-growing regions of Vermont as it has ever been known before. This is largely due to the favorableness of the season; but partly, also, to the considerable number of young trees coming into bearing. In fact, the present remarkable supply of apples calls attention to the fact that, in the apple-growing sections of the state, orchard planting has been steadily going on for some years. In contrast to this, in those parts of the state where apples are not commercially grown a young apple-tree is a curiosity.

The crop in Vermont is not only large, but is much better in quality than usual. This, of course, must be credited largely to a favorable season, for, with the very large crop carried by all trees, it would not have been surprising to gather small and poorly flavored apples. The summer was comparatively dry, without being disastrously so, and the damage by the scab-fungus was therefore reduced to a minimum. Thorough spraying, now generally adopted in this region, contributed to the same result. This year's spraying, fortified by good spraying in preceding years, has also practically eliminated the factor of loss by the codling-moth. There is thus an unusually large proportion of first-class fruit.

Prices have been low here as elsewhere. This misfortune has been aggravated in many neighborhoods by proportionally large pickings of early fall fruit, mostly Fameuse (Snow). These early apples have been pressed upon all buyers to the temporary disadvantage of the later varieties. A few growers

are prepared to store their winter apples. The winter varieties most grown for market are Northern Spy, Rhode Island Greening, Baldwin, King and Golden Russet, with a considerable number of young Ben Davis coming into bearing. The Arctic is a new commercial variety of great promise, now just beginning to bear.

Although prices are low, the crop will be sold at a profit, and commercial apple-growing on the shores of Lake Champlain will receive substantial impetus and encouragement.

Vermont Experiment Station.

F. A. Waugh.

Dendrolene as an Insecticide.

To the Editor of *GARDEN AND FOREST*:

Sir,—Among other things which have been sent to us for trial the past season was a package of Dendrolene, sent by the Bowker Fertilizer Company, of Boston, Massachusetts. They asked that it be given a thorough trial on various kinds of fruit and shade trees, for the purpose of determining its effectiveness in keeping out borers and other noxious insects, and also as a protection against mice and rabbits.

The material was applied to a number of young, healthy stock trees of Champion, Crosby and other varieties of Peach, and also to a number of the same varieties bearing their first crop of fruit. A number of young Apple-trees, just transplanted, were also coated. The material was applied in May, according to directions, by coating the trunks of some trees from the ground to the lower branches, and others only about half-way up. On examination, about the middle of August, it was found that several of the young Peach-trees were beginning to drop their leaves and to show signs of general debility. A little later the older trees began to show signs of trouble, and on making a careful examination of the trees about the first of September it was found that the material had been absorbed by the bark to such an extent as to shut off the circulation of sap completely, and that the inner bark, or cambium, had turned black and apparently dead. The same was true to a somewhat less extent in case of the young Apple-trees, so that a month later every Peach-tree and most of the Apple-trees to which the material was applied were dead.

As it is not always safe to draw conclusions from a single experiment, it was not deemed advisable to publish these results until the material had been given a further trial, inasmuch as it had been carefully tested in New Jersey under the direction of Professor J. B. Smith, one of the most careful and competent entomologists in this country, and found to work very successfully (see New Jersey Experiment Station Bulletin III, also *GARDEN AND FOREST*, vol. viii., p. 470). But in looking over the September number of the *Wisconsin Horticulturist* I find an article by Professor E. S. Goff on the same subject, and giving similar results, except that his losses were much greater than ours, as he "had it applied to the trunks of nearly one hundred trees." And he adds, "Many of the trees to which it was applied are already dead, and the indications are that few, if any, of them will ever leave out again." It seems a little remarkable that the results obtained in Wisconsin and Indiana should be so different from those obtained in New Jersey, but these are the facts, which I am at present unable to explain. It would seem, however, that we are safe in saying this much, that the material in its present form is not safe to use on young Peach-trees in this section, and I would not recommend its use on any tree until further trial.

Experiment Station, La Fayette, Ind.

J. Troop.

Recent Publications.

American Highways: A Popular Account of their Conditions and the Means by which they may be Bettered. By N. S. Shaler. New York: Century Company.

In the preface of this excellent book Professor Shaler modestly recounts some of the personal experiences which have helped to educate him for its preparation. He states that during the civil war he was called upon to study the significance of wheelways in the critical work of campaigns; that ever since the war he has been interested in road-making in connection with geological work; that he has been actively engaged for four years as one of the Massachusetts Highway Commission in developing a plan for the betterment of the roads of that state; that he has helped to lay out and construct a hundred roads, having made a special study of the relations of road-building ma-

terials to the special needs of each; that he has helped to devise a system for the instruction of road-making engineers in the Scientific School of Harvard University; and that he has prepared reports to the United States Geological Survey on road-building materials. To these practical qualifications it may be well to add that his mind is trained to habits of close observation; that he has the sound judgment which insures safe generalization; that he takes a comprehensive and common-sense view of the relations of his subject to the social and economic needs and habits of our people, and that he has the faculty of orderly and lucid statement. Of course, his book is graphic and instructive, and we may add that it is especially timely. The desire for an improvement in our highways has grown within a few years until it has assumed the dignity of a popular movement, and it is important that the people should not be carried away by mere enthusiasm to waste their money on experiments. Therefore Professor Shaler's account of what has been done and what can be done in the way of road construction and maintenance cannot but be helpful to every public-spirited citizen who reads it, and especially to every one who has the remotest official connection with our highways. It is not meant to be a treatise for engineers, but it will be found a safe and sufficient guide as to plans, material, repairs and administration for every one except the professional road-builders, who need to be schooled and skilled in the refinements of the art.

It has come to be admitted by the discerning that good facilities for transportation are necessary to the best intellectual development of a people as well as to their physical comfort and financial prosperity. Our people, therefore, need instruction in the history of roads and their relation to human progress. They ought to learn, first of all, that the building of a good road is a task which demands serious thought, and that the design and construction of a highway should never be undertaken except by men who have special and adequate training for the purpose. Again, the people ought to have clear ideas of what it costs to build good roads and what it costs to keep them; and if, in order to secure the advantages of good highways, they feel that they can afford to expend a certain amount they ought to have some general ideas of the methods which must be adopted if this amount is expended to the best advantage. Since the conditions which determine what is the best road system vary greatly in different parts of the country, it will not answer for any community to copy blindly the methods of another, for such a simple matter as the character of the subsoil or the kind of stone available for the surface, or some other single feature of the situation, may differ so much in the two cases as to change the whole problem fundamentally. The questions which naturally present themselves to one who takes this view of the case, and many more which grow out of special conditions, are discussed by Professor Shaler in a very attractive way. These questions are so comprehensive and touch so many interests that even the unfortunate person who is known as the general reader will find much pleasure and profit in such chapters as those which treat of the relations between roads on the one hand and climate, soil, topography, forests, etc., on the other.

In almost every chapter, and especially in those which treat of the Distribution of Road Material and Methods of Administration, there is something we should like to quote, but we have only space to call attention to a few points brought out in the chapter on the Relation of Public Highways to the Ornamentation of a Country, which is more within the special field of this journal. Roads can do very much to modify a landscape in one way or another, and therefore it is fitting that a civilized community should pay some heed to the æsthetic quality of our highways. Professor Shaler holds that roads, as a rule, fit harmoniously with the natural views of the country they traverse in proportion as they are laid out and built to best serve the needs of that country. That is, the more graciously they accommodate themselves to the surface the more likely they are

to be a pleasing addition to the prospect. The first æsthetic law in the construction of a road is that it should not be obtrusive, and if it is held as nearly as possible to natural grades it will not be so offensively manifest as it will be if carried boldly against obstructions so as to require much excavation and embankment. A second point is that the traveled way should not be unnecessarily wide. A road with a wheelway not more than fifteen feet wide is nothing more than a thread in the landscape from any point of view, while a space of fifty or sixty feet in width, plowed by irregular ruts, will have a much greater tendency to mar the beauty of any scene. Where the shoulders of the road are kept in grass, the slopes sown with grass or planted with some vegetation, beauty as well as utility is served. Roadside trees, if planted so thickly as to make a deep shade, have a tendency to keep a dirt track too wet. If they are strong-growing trees they are apt to extend their roots under the gutters and roadways so as to disrupt the structure, and in the winter season their effect on drifting snow may be bad. It is also true that regular lines of trees give an artificial look which is not always pleasing, although when the trees are individually noble their own beauty may offset this defect. Long lines of evenly grown trees of certain species may also produce some pleasing architectural effect; the arching habit of the American Elm and the columnar growth of the Lombardy Poplar adapt these trees especially for such use. But we agree with Professor Shaler that the highest adornment of a road is accomplished by the systematic planting of trees in groups on either side of a traveled way, the species being varied and the outline of the plantations toward the road broken so as to make pleasing vistas. This work of planting should be entrusted to some one who is familiar with the expression of trees in their adult growth, and when highway borders are properly planted this will prove the most satisfactory of all rural adornments which can be secured for a given amount of outlay. The suggestion of Roadside Parks is so novel that we quote the passage:

Now that the advantage of public reservations is much considered by our people it appears desirable to organize parks or commons with reference to the main highways. On almost any road having a length of three miles or more it is possible, in New England at least, to select one or more attractive bits of ground which may be devoted to this use. These reservations need not be of great area in order to be effective. It often occurs that a strip of land next a river or lake which is skirted by the road or a bit of picturesque rocky ground can be obtained by gift or at a low money cost because the place has no agricultural value. Although it is desirable that all these dedications to public use be cared for, it is often better that they should be left in the simple wilderness state rather than be made the seats of elaborate ornamentation. A study of the Massachusetts roads indicates that a thousand reservations of the nature here indicated could be obtained by purchase at a fair money value, at a total cost of less than \$100,000, the average area being not over five acres. The probable total length of the roads in Massachusetts which are to be taken over by the commonwealth is 2,000 miles. Thus the system proposed, if completely applied, would give bits of park at an average of about two miles. The Trustees of Public Reservations is a body empowered to hold pieces of land in Massachusetts dedicated to public use, and this indicates an excellent means whereby land may be held safe from the temptations which would beset municipalities to part with such holdings at the solicitation of persons of local influence. The transfer of roadside park places to similar commissions in other states is to be commended as a measure of safety against such encroachments as have served to destroy many of the original commons in Massachusetts and other states, and which in Great Britain have lost to the people more than three-fourths of the land which were public property three centuries ago.

In the same chapter there is a strong plea for stone arch bridges, not only for enduring quality but for their beauty. Steel bridges, according to the present methods of construction, are necessarily unsightly, and no attempt at decoration can make them otherwise. The book is helpfully illustrated, and it has instructive appendices about road legislation, experiments on material for road-building, contract

prices for roads actually constructed, and a list of important works of a popular character on highway construction.

Notes.

A temperature in the seventies is unusual the last week in November, and therefore it is not surprising that the trees started into leaf, that the lawns hereabout were starred with Dandelions and other spring flowers, and that many early-flowering shrubs showed abundant bloom. This was especially true of the Bush Honeysuckles, *Lonicera fragrantissima* and *L. Standishii*, whose white flowers appear before the leaves in spring. Many of these bushes in Central Park displayed a fairly good crop of fragrant flowers.

As a rule, the production of Orchids from seed is a long process, but with some species it would seem that the grower may not be obliged to wait an unreasonable time for new plants. A correspondent of *The Orchid Review* writes that on the 28th of March, during the current year, he applied the pollen of *Phaius grandifolius* to the stigma of *Bletia catenulata*, from which a pod ripened and burst on the 10th of May. The seeds were planted the same day, and on the 4th of June a batch of seedlings were up, and are now nice little plants—that is, the whole period from the application of the pollen to the germination of the seed was only a little more than nine weeks.

A correspondent, Mr. F. K. Steele, writes from the Ozark Hills in praise of the beauty of *Talinum teretifolium*, a low, leaf-stemmed, succulent plant belonging to the Purslane family. It is, indeed, a pretty little plant, bearing on stems about five inches long a cyme of pink and rose-purple flowers which keep succeeding one another from June until August. It is said to be a perennial, but Mr. Horstford, in an account of it in this paper a few years ago, stated that it flowered the first year from seed, but did not survive the winter. This, however, may have been owing to the open winter. It does well in shade, and in the Ozark Hills it grows where the soil is only a few inches thick above the rock.

Dr. Halsted calls attention to a serious trouble with Chrysanthemums in the shape of a blight which spots the flowers as soon as they are fully developed, and sometimes before. The trouble starts with small circular dark specks on the corolla of the florets, which are darker than flowers of the lighter shades and lighter than the maroon-colored ones. These spots have a watery appearance at first, which is shortly followed by a dry condition and a white mildewy growth which finally turns olive and brown and entirely destroys the flowers. Sometimes there are half a dozen starting points of the blight, and then the destruction is very rapid. Skillful growers say that the life of the plant is shortened at least one-third of its natural length. The fungus is a member of the genus *Alternaria*. The spores are produced abundantly upon the surface of the blighted mass, and as they germinate quickly a house once attacked is quickly overrun.

From a treatise on American Vines in France, lately prepared by Messrs. P. Viala and L. Ravaz, it appears that our *Vitis rotundifolia* possesses the greatest immunity from the attacks of phylloxera, and in a list of Vines where the Number 20 represents absolute freedom from attack this species is rated at 19. After this comes *V. riparia*, which is marked 18, and in the same grade we find various hybrids between *V. rupestris*, *V. cordifolia* and *V. riparia*. The first plant in the grade, numbered 17, is *V. Berlandieri*, which is followed by some hybrids. It seems from the list that many of the hybrids are better adapted to resist the attacks of the phylloxera than either of the parent species. Of course, the American Vines are not entirely exempt from phylloxera, but they do not yield to the attacks as the European kinds do, so that the introduction of our plants to be used as stocks upon which the European varieties are grafted has saved thousands of acres of vineyards in France from destruction. This report gives many interesting facts in regard to the methods of grafting and of cultivating the vines and the adaptation of the different American species to various soils and exposures.

Mr. W. G. Johnson, the Entomologist of the Maryland Experiment Station, declares in a recent bulletin that it is somewhat difficult for an average observer to detect the San José scale unless it is very abundant. When a twig is badly infested the entire surface appears under a hand lens as if it were a continuous mass of minute shells from the size of a pin's head downwards. If one of the larger scales is raised with the point of a knife, a small, waxy-looking mass may be seen, and this is the insect. During the summer young orange-

colored lice can be seen crawling over the twigs, but they are mere specks. When the branch of a tree loses its foliage before the rest of the tree, or when a twig appears as if it had been covered with ashes, it should be carefully examined, and when the bark of infested twigs is scraped with a knife the numerous insects cause an oily yellowish liquid to appear on the surface. In Pear-trees particular attention should be given to the extremities of the twigs, especially if the leaves turn brown. In infested fruit of the Pear an encircling band of reddish discoloration is seen around each insect. A little lady-bird beetle about the size of a pin's head is often seen running about on infested trees, and wherever it appears on trunk or branches a careful search should be made for the scales on which it feeds.

W. H. Lincoln and Mayflower are still among the best chrysanthemums seen in the flower-shops this week, with some especially good blooms of the golden-yellow Mrs. Grant, brought from Philadelphia. Other chrysanthemums yet in the trade are the yellow Challenge, said to be a good keeper, the pink Erminelda, George W. Childs, Sunrise, bright terra-cotta tinged with gold, and Niveus. Among the highest-class carnations of many varieties now in season are the bold white flowers of Storm King, Maud Dean, white ground, shaded and splashed with rosy pink, and the handsome Lillie Dean, very double, delicately striped and edged with bright red, and delightfully fragrant. After these in popular favor and price come the showy Portia and the dark maroon Anna Webb, Daybreak and the rosy Tidal Wave. Somewhat more plentiful and cheaper are William Scott and Lizzie McGowan, while Alaska and Mrs. Fisher are other varieties noted. The new President Carnot roses command \$6.00 a dozen; Bride and Bridesmaid, \$4.00, and American Beauty, \$12.00. The window of one of the Broadway establishments, where a few odd and rare flowers are almost always to be seen, yesterday contained some plants of *Sarracenia purpurea* (wild Pitcher-plants), giant spikes of Mignonette, flowers of blue Centaurea, lily-of-the-valley, Violets, white and pink Bouvardia, Bermuda lilies, jessamine, stevia, paper-white narcissus, flowering Roman narcissus, well-berried sprays of holly, and Cyclamen-plants in flower. Anthuriums and Cypripediums were striking features in other window decorations, as were luxuriantly flowered Heaths, Otaheite Orange and low, compact Azaleas. In one display thickly berried, leafless branches of *Ilex verticillata* gave brightness to a drapery of *Asparagus plumosus*.

Anthony Waterer died at Knap Hill Nurseries, at Woking, in Surrey, on the 16th of November, after a short and painless illness, in the seventy-fifth year of his age. He is most widely known as the originator of many of the best hybrid Rhododendrons in cultivation, and he and predecessors in his family did more than any other firm to popularize the cultivation of Rhododendrons, Azaleas and other hardy shrubs of this class. The Knap Hill Nurseries, which had long been notable, grew in size, importance and reputation under Mr. Anthony Waterer's successful management, and at the time of his death had become probably the greatest nursery of hardy plants in the world, although a larger number of species of plants were cultivated in others. For Rhododendrons, however, hardy Azaleas, to which of late years Mr. Waterer gave special attention, and the choicest conifers it had no rival. Anthony Waterer had many correspondents in the United States. His connections here date from the time of Downing, who imported plants from Knap Hill for the Capitol grounds at Washington. After Downing's death the unpaid bill for these plants was found among his papers by his executor, Henry Winthrop Sargent, of Fishkill. Mr. Sargent was a classmate of Charles Sumner, and through his assistance he succeeded in obtaining from Congress an appropriation to pay this bill. From this sprang the friendship which existed for years between Mr. Waterer and Mr. Sargent, who for many years was one of the principal horticulturists of the United States. From this friendship others sprang, until gradually all the principal cultivators of hardy trees and shrubs in the United States became friends and clients of Anthony Waterer, who of late years has devoted special attention to breeding Rhododendrons capable of supporting the climate of this country. In 1876, when the Knap Hill Nursery made a special exhibit of Rhododendrons in Philadelphia, Mr. Waterer visited the United States. A man of the highest integrity, rough in manner, but kind of heart, Mr. Waterer was a type of the English cultivator of the old school not often seen now. We all owe him a debt of gratitude for the plants he has produced for us, and those who have had the advantage of his friendship will never forget his strong and interesting personality.

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The Western Larch.

LARCH-TREES are widely scattered over elevated and boreal regions in the northern hemisphere. They make a distinct group botanically, with needle-shaped, deciduous leaves borne in dense fascicles on short spur-like, arrested branches, and erect cones formed of thin, obtuse, persistent scales. Seven species are now recognized by botanists. The type of the genus, *Larix Larix*, inhabits high slopes of the Alps of central Europe and of the Carpathian Mountains, often forming extensive forests, either growing with other trees or mixed with mountain Pines or with the Spruce at the upper limits of tree-growth. A great deal of attention has been given to this tree by silviculturists, and during the last century it has been very extensively cultivated in most of the countries of Europe, especially in Scotland, where large plantations have been made by the Duke of Argyle and other landowners. The European Larch was introduced into the United States early in the present century, and it is one of the few European trees which have flourished in the northern states, where several plantations of this tree have been made, and where it promises to produce valuable timber.

The Siberian Larch, *Larix Dahurica*, forms great forests in some parts of northern Russia and Siberia, and is common in the forests which cover the Ural and Altai mountains, and in northern China, Manchuria, Kamschatka and Saghalin. *Larix Griffithii* occurs on the interior ranges of the Himalayas at elevations of from 8,000 to 12,000 feet above the sea, in Boutan, Sikkim and east Nepal. In Japan *Larix leptolepis* is a common tree at high elevations on the island of Hondo, where, however, it does not form continuous forests, but is scattered in small groves mixed with other deciduous-leaved trees; and northern Yezo and some of the Kurile Islands are inhabited by a form of the Siberian Larch which appears in our illustration on page 525 of vol. vi.

Three species of Larch are embraced in the silva of North America; the most important of them is *Larix occidentalis*, the noblest of all Larch-trees, and one of the important timber-trees of this continent. Discovered by David Douglas

near one of the Hudson Bay posts on the upper Columbia River in 1827, it was mistaken by him for the Old World species, and no attention was paid to this tree until many years later, when Mr. Nuttall found it on the Blue Mountains of Oregon and described it in 1849 in the third volume of his *North American Sylva*, and it was not until thirty years later that it was introduced into cultivation through the agency of the Arnold Arboretum.

The Western Larch, under favorable conditions, when growing in low, moist soil, attains the height of two hundred and fifty feet and forms a trunk five or six feet in diameter; in dry soil and on exposed mountain slopes it has an average height, perhaps, of eighty or one hundred feet and a trunk two or three feet in diameter. It is peculiar in its long, tapering trunk and in the shortness and smallness of its branches, which form a short and remarkably narrow and rather open spire-like head, which is always a striking object in the forest. Mixed with Spruces, Hemlocks, Firs and Cottonwoods on bottom-lands, and with the Douglas Spruce and different Fir-trees on elevated slopes, the Western Larch never forms pure forests—at least to any extent. Its home is the mountain forests of the basin of the upper Columbia River, through which it is scattered at elevations between 2,500 and 5,000 feet, about latitude fifty-three degrees north to the western slopes of the Blue Mountains of north-eastern Oregon and the western slopes of Mount Jefferson, one of the high peaks of the Cascade Range in the same state; on the east it does not cross the continental divide, and the western limit of its range is bounded by the summits of the Cascade Mountains. In British America and on the Cascade and Blue mountains—that is, in the north and in the south—the Western Larch is comparatively rare and usually of small size, and it attains its greatest perfection on the streams which flow into Flathead Lake, in northern Montana, and in the heavily forested region of northern Idaho and north-eastern Washington. In this part of the United States it is one of the largest and the most valuable inhabitant of the forest.

The Western Larch is chiefly valuable for three reasons: The wood which it produces surpasses that of all other American conifers in hardness and strength; it is very durable, beautifully colored and free of knots; it is adapted to all sorts of construction, and beautiful furniture and the interior finish of buildings can be made from it. No other American wood, however, is so little known, and in the sparsely settled and remote region which is the home of this tree it performs only an unimportant service to the community. The Western Larch is also valuable in the power of its seedlings to germinate freely and in the power of the young plants to grow in the shade of other trees, which they finally overtop and subdue. Even a tree of such vital force as the Lodge Pole Pine, which in all the northern Rocky Mountain region speedily covers the ground from which fire has swept the original forest-growth, is mastered by this Larch. But the chief value, perhaps, of the Western Larch is due to the thickness of its bark which enables half-grown trees to bear without permanent injury the heat of the fires which are fast destroying many of the trees in the forests of the Columbia Basin. On the young tree the bark is thin, dark-colored and scaly, but at the end of about a century it thickens near the ground, becomes bright cinnamon-red in color and breaks up into great plates, the trunk of an old Larch-tree becoming magnificent in color and markings. Something of the character of the trunk of this tree may be seen in our illustration on page 497 of this issue, which is made from a photograph taken last summer in north-western Montana by Mr. Gifford Pinchot, to whose courtesy we are indebted for the opportunity of reproducing it.

Larix occidentalis has proved hardy in the Arnold Arboretum where, however, plants on their own roots have grown slowly and unsatisfactorily up to this time, while grafts on the roots of the Japanese Larch have made a rapid and vigorous growth and have already produced cones.

In European plantations this tree is still little known; and it is too soon to speak with any authority of its future either as an ornamental or as a timber tree in the eastern states or in northern Europe.

A second Larch of north-western America, *Larix Lyallii*, is a small tree found only near the timber-line of high mountains in southern British Columbia and in northern Washington and Montana. Still imperfectly known, this tree may perhaps be best considered an alpine form of *Larix occidentalis*. It has not yet been brought into gardens.

The third American Larch, *Larix Americana*, inhabits the east, where it is widely and generally scattered from the shores of Great Bear Lake and the valley of the Mackenzie River within the Arctic Circle to the coast of Labrador and Newfoundland, and southward through the Canadian Provinces and the northern United States to northern Pennsylvania, northern Indiana and Illinois and central Minnesota. Our eastern Larch is a tree often eighty or ninety feet high, with a trunk two or three feet in diameter and comparatively stout branches, which on old trees become long and are often irregularly developed and frequently much contorted. At the north the eastern Larch inhabits moist uplands and intervale lands, but south of the boundary of the United States it is confined almost exclusively to wet and often overflowed swamps and bogs, which it frequently covers with nearly pure forests. Like that of all the trees of this genus, the wood of *Larix Americana* is hardy, strong and durable; and, like other Larch-trees, it is valued in ornamental plantations for its rapid growth and the picturesque habit it assumes in old age.

In a recent number of the *Revue Horticole*, Dr. A. Franchet describes a new Chinese tree recently discovered by Farges in China near the thirty-second degree of north latitude, for which he proposes the name of *Carrierea calycina*. In habit it is said to resemble *Idesia* and is thought to belong to the Bixaceæ. Fresh seeds have been received at the Museum in Paris and already distributed. It is probable that this interesting tree, however, will not prove hardy in our northern states, in spite of the fact that it grows naturally at a considerable elevation above the surface of the sea. This new genus is dedicated to Carrière, the distinguished French horticulturist who died near Paris a few months ago and who will best be remembered perhaps by his important work on Conifers cultivated in Europe, of which two editions have appeared. He was the author, moreover, of numerous publications on horticultural and philosophical subjects, and for many years, as the head of the nurseries at the Paris Museum, occupied one of the most conspicuous positions in European horticulture. In dedicating this new genus to his memory, Monsieur Franchet says "Carrière was a skillful horticulturist, an experimenter of profound intelligence and a zealous introducer of everything which could contribute to the utility and beauty of gardens and the future of forests. He was also a profound thinker who was often able to give to his thoughts a form fantastic, perhaps, but always striking, which many writers might well envy."

Climbing Plants in the Pines.

FEW, if any, climbing plants are more interesting than some of the neglected species of *Smilax* growing in our Pines. Almost any one of the woody species, if rightly used, would be an acquisition to the finest parks and gardens. It is true that in some situations in the damp Pines they form almost impenetrable barriers, and in the early days of our country's settlement they may have been quite troublesome, and we possibly have an inherited dislike to the "hateful Catbrier." If we examine a single plant of the most common species, *Smilax glauca* or *S. rotundifolia* or *S. hispida*, which grow almost everywhere, from New England to Florida, and west to Missouri and Texas, we find botanically handsome netted, veined leaves—which

are not common among the endogenous plants—and a pair of tendrils at the base of the leaf, not on the petiole proper, unless it is jointed, when the lower part, which is persistent, becomes a sheath to protect the bud in winter, especially the flower-buds. The short petiole is attached to this sheath by a joint, and when the leaf is mature it drops and falls to the ground, which it could not do if the coiled tendrils grew on the leaf-stalk. The flowers come from beneath the sheath in spring, and in the fertile plant—these plants are usually dioecious—are succeeded by the berries. On *S. hispida* we find from one to three peduncles emerging from a sheath, and at this time of year each bearing a cluster of from three to ten or more berries. The pedicels are nearly half an inch in length. A large, strong stem will produce leafy, fruiting branches from the sheathed buds, and thereafter it will no longer bear buds, and the branches will take up the work.

In the Pines, *Smilax rotundifolia* is nearly evergreen, with lustrous leathery leaves and an abundance of dark blue berries which remain all winter. The leaves of *S. glauca* are still more persistent, and it has black fruit covered with a bloom. Several plants are established in my wild garden. *S. hispida* is rambling through a Hemlock, not hurting it in the least, and very attractive it looks peeping out here and there with its clusters of fruit. One of the handsomest species is *S. laurifolia*, which has long, thick evergreen leaves, and in winter we see both black and green berries, as it takes two years for the fruit to ripen. Another handsome species, but less common in the Pines, is *S. Walteri*, with clusters of bright red berries which, mingled with the dark blue of *S. rotundifolia* and the black of *S. glauca* and *S. hispida*, make a fine display. The leaves of most of the species turn to rich colors in autumn, and all of these, with several other native species, would make the best of material for boundary plantations and many other situations, especially in large parks or private grounds.

Celastrus scandens is another ornamental climber growing in the damp Pines. The reddish-colored seed-pods open in the autumn and disclose the bright scarlet covering of the seeds. The two forms of *Ampelopsis* found here are sufficiently dissimilar to attract the notice of any observer. One has much larger leaves than the other, which are green and not shining, and the flower-clusters are cymose opposite the ample leaves and not at all conspicuous. The other has smaller leaves, smooth and shining, and often purple-tinted; the flowers are purplish and more thyrse-like than cymose. The short flowering stems stand well up above the larger branches, especially when it climbs over a low-headed Apple-tree, as it has in my garden. It blossoms later than the other, and when in flower is one of the handsomest climbers on the place and attracts more notice than any other plant. Insects of many kinds, especially the Hymenoptera, visit it in great numbers, coming in swarms while the plant is at the height of its bloom.

Many of our climbers will endure a wonderful amount of hard treatment without showing any loss of vigor. One of our native Trumpet creepers, *Tecoma radicans*, had climbed a few years ago to the top of a Pine-tree in the garden. The trunk of the tree was free from branches for about twelve feet, and the top was dense for a Pine and round-headed, so that it presented a large surface to the wind with comparatively small power to resist it, and one of our July gales carried away the top and left a bare stub twelve feet high. The vine, of course, came down with the tree, and the lower branches, which had formerly held it to the trunk, had mostly died; at all events, it was torn free from the trunk and was cut back to just the length of the stub. It had no foliage, and was held in place with bands, but it soon threw out branches from adventitious buds and fastened itself firmly to the trunk without regard to the artificial support, and finally sent out branches all around the top. As there was no way for it to climb any higher, it has developed an umbrella-shaped head; the numerous branches, four feet or more in length, curve

downward, and when the ends are all ablaze with flowers it makes a unique and handsome display.

The American Wistaria, too, will endure various modes of treatment, and, like its Asiatic relative, can be pruned and trained into a handsome shrub. I have trained one about a post some six feet in height, and keep it cut back, and with its first flowering in late spring it is a mass of bloom from base to summit. After the first heavy flowering is past it continues to bloom more or less all summer.

Vineland, N. J.

Mary Treat.

A Cañon near Ukiah.—II.

SOME travelers have said that California has no Ferns and no sweet-scented flowers. If they would follow the line of one of the lumber flumes close to the coast in this county they would apologize for the first statement, and if they once had the pleasure of inhaling the fragrance of the Ruby Lily, *Lilium rubescens*, they would repent of the other. *L. rubescens* ranges from Sonoma County north, possibly to the Oregon line. It is widely distributed, yet seldom seen even by flower lovers living near its home. This is because it prefers the highest slopes in the Redwoods, the Chapparal, or rocky places densely shaded by the true Live Oak, *Quercus chrysolepis*. As all these spots are somewhat inaccessible, our finest Lily is scarcely known even where it is commonest. The bulb is ovate and ordinarily four to six inches in circumference. The leaves are all in whorls, dark green in color. Its height varies greatly. A forest fire helps it wonderfully, and the year succeeding a fire nearly every little bulb will flower. Some plants may be less than two feet high, with two or three flowers, but in deep soil where they are not too much shaded the old bulbs throw out immense stalks. I have often seen stalks seven feet high with twenty-five flowers, and in one case nine feet high with thirty-six flowers. The blossoms in well-grown plants are three inches long and trumpet-shaped. At first white, thickly dotted with purple, they turn purple and then to a deep ruby. On one stalk all shades can be seen. Compared with *L. Washingtonianum*, the petals are much broader and the fragrance heavier. A single flower in a book has perfumed it for months, and the odor of the fresh flowers is exquisite. I did not know of their existence in Doolan Cañon until one day the wind wafted their perfume to me, and later, far up the hill, I found a large grove of Tanbark and Redwood and this Lily.

The commonest Fern of these cañons is one of the Aspidiums, *A. rigidum*, var. *argutum*. It is low, deciduous, growing in loose, rather dry, soil on deeply shaded hillsides, and is quite fragrant. Two other Aspidiums (*Sword Ferns*) grow in this cañon. *A. monitum*, var. *imbricans*, is a large Fern, and here prefers shady slopes in rocky débris. It is dark green and rather handsome. *A. aculeatum*, var. *lobatum*, is an elegant Fern, rare on cliffs close to the stream.

In the loose rich soil close to the stream the little deciduous Maiden-hair, *Adiantum emarginatum*, is plentiful, and many shaded slopes are covered with this delicate fragrant Fern. It is much like *A. Farleyense*, but a lighter green. It starts early, and by May is at its best, while by August little of it is left. On the same cool slopes grows the Scarlet Larkspur, *Dianthus nudicaule*, and its tall racemes are in most appropriate company. A little later, and while the Maiden-hair is still fresh, a yet more beautiful companion appears, The Fire-cracker, *Brodiaea coccinea*. This plant likes these cool slopes, and in June its tall wing-scape rises to two or three feet, crowned with the crimson flowers in an umbel. There are rocky ledges and cliffs farther up the stream where it thrives still better and forms hanging gardens. It is one of many plants which thrive better with civilization, for when the Redwoods were cut the conditions most favorable to its growth were created. The little Gold Fern, *Gymnogramme triangularis*, is plentiful throughout the cañon where the soil is loose and gritty and the

shade not heavy. Some steep banks among the Chapparal growth are thick with it, and on the cliffs of the middle cañon it grows under the shelving rocks. Its three-cornered fronds are dark green above, golden below. It is not generally supposed to stand frequent summer watering, but at home a nice clump grows under the same conditions that Aspidiums and Asplenium thrive in, except that the Gold Fern is better drained.

A mile or so above the valley there is a long stretch of the cañon where the stream flows between rocky walls with barely footway along the side. On the cliffs, which are well shaded by trees standing in the stream-bed and by others above, many Ferns and Mosses find a congenial home. In many places the rocks are covered with one solid mass of *Polypodium Californicum*, and in early spring the descending lanceolate fronds are a pretty sight. In the loose soil at the base of the cliffs *Aspidium riginum*, var. *argutum*, and Maiden-hair grow plentifully. In the crevices *A. aculeatum*, var. *lobatum*, grows, while on the moist rocks on the sunny side of the cañon, growing under the bushes that hang to the rock, is a very delicate *Pellaea*, *P. andromedifolia*. It has a brown polished stalk with elliptical segments, and is little inferior to Maiden-hair in delicacy. Not so the other *Pellaea* of these cañons. *P. ornithopus* grows in dense tufts on the hot slopes where in the Chemise brush some rocky point has broken down in a mass of fine débris. Roasted by the sun during the long, hot summer days, it revives with the first rains in the fall and begins its growth. It is fully as ornamental as an old broom.

There is one other Fern in the cañon, the Chain Fern, *Woodwardia radicans*. It is a Fern of the stream-sides and springs. Along the brook, scattering clumps can be seen, with ovate-lanceolate fronds two to four feet long, and spreading gracefully. It is an evergreen, and the fronds of one season persist in good form until the fronds of the next year are well developed. Beautiful as it is in the cañon, it is only to be seen at its best where it grows in the peat and mold of some of the mountain springs. There the fronds are in dense thickets often seven or eight, and in cases eleven, feet high. It is the favorite decorative material in the Coast Range region.

The first shrub to come in leaf in the spring is the Californian Buckeye, *Æsculus Californica*. Long before other buds swell, its light green leaves appear. It grows in the mountains to the height of ten to twenty feet, many-branched, from a warty base. Its shade is not dense, and it grows mostly in very warm loose soils, and Ferns and a variety of annual flowers seem to live within its protection. Its most beautiful guest is *Eucharidium concinnum*, one of those things so exquisite in color and delicate in form that cultivators do not try to improve it. It is one of the last of the annuals to flower, and in June it is to be seen in pink masses under the Buckeyes, and with the Maiden-hair on the shadier slopes. A little earlier, and in the drier parts of similar places, were showy masses of *Collinsia bicolor*.

Three *Calochorti* are to be seen in the cañon. On the warm southerly slopes at the mouth of the cañon *C. venustus* grows sparingly in grassy openings in a soil which by midsummer is baked like a brick. Its white flowers, beautifully oculated, are borne in June. A very few are creamy or buff in color. It is the prevailing Mariposa Tulip of Ukiah valley. It is in the Black Oak woods and under the Manzanitas that *C. pulchellus* must be searched for. In rich soils its single glossy leaf is often a foot long. Later on in May and June the graceful scape follows, and the globular flowers, delicately fringed with silky hairs, are among California's prettiest. More retiring in habit, and more modest in flower, is *C. Maweannus*. Its home is up among the shadiest nooks in the Black Oak wood. Its leaf resembles that of *C. pulchellus*, but the exquisitely delicate flower is an open cup lined with long silky hairs. The children hereabout have named them Pussy-ears, not inappropriately.

Doolan Cañon has its Orchids also. There are but two, but they are fine. *Habenaria elegans* is a delicate species growing in shaded woods. I knew the cañon long before I first saw a Lady's Slipper in it. One day in exploring for Ruby Lilies I discovered a considerable mountain side of open timber, Redwood and Tanbark Oak, and in the coolest and shadiest parts, around places where a little moisture seeped out, were several fine plants of *Cypripedium montanum*. It is an elegant plant in every respect. The leaves are large and showy and the flower is very fine. It forms clumps of usually one to three plants, with a running scarred rhizome. The blossom comes in May, and with sepals and wavy-twisted petals brownish and a white lip veined in purple. The flower is about two inches across and has the scent of vanilla. I have never seen it plentiful or heard of it being so, except in one part of the "Blue Mountains" region of eastern Oregon, where it is plentiful in places.

A feature of all these cañons, disagreeable to many, but, nevertheless, beautiful, is the great quantities of Poison Oak. It is really too bad that so beautiful a shrub should have poisonous qualities for so many. I have noted that very few persons who live here from childhood are poisoned by it. I am entirely free from its effects. It grows in dense copses in places, and in others it clambers over the trees. In spring and summer its leaves are among the best greens of the mountain, but in fall it is colored in the most glowing reds and scarlets, and whole hillsides are made beautiful by it. Like the Buckeye, it is a friend to the choicest annuals, bulbous plants and Ferns. Among the Poison Oak bushes are to be found the finest Fire Crackers and other *Brodiaeas*, the largest Scarlet Larkspurs and the finest plants of the showier annuals, such as *Clarkias*, *Godetias* and *Collinsias*.

The old sled road follows up the cañon for fully two miles, first through the open vale among the Oaks, then through a gorge of cliffs, where a foothold for it was blasted by pioneer woodsmen, then for a long way through a section of long, smooth timbered slopes beautiful with Redwood, Madroña, Live Oaks, Douglas Spruce, and overlooking the stream-bed filled with large Alders and second-growth Redwoods. Finally the road ends where three precipitous gorges, each the parent of a living spring, meet. There, where once stood a fine grove of Redwoods, it ends, and some of the rails and pickets cut so long ago still lay, as sound as when riven from the log. The central gorge is a large spring coming from the rock. Looking from the base, it is a wavy mass of Spikenard, *Aralia Californica*, five to seven feet high, mixed with the dark green fronds of the Chain Fern. On the sides are Oregon Maple, Live Oaks hang from the cliffs, and a few large Redwoods, which the old woodsmen could not reach, stand above as they have stood for hundreds of years. Above, on every side, stretch the long mountain slopes, densely overgrown with the Chapparal, effectually ending a tramp farther.

Ukiah, Calif.

Carl Purdy.

Foreign Correspondence.

London Letter.

DIPLADENIA SANDERL.—This new species, which has been introduced from Brazil by Messrs. F. Sander & Co., St. Albans, is a very promising plant for the stove. In habit and general characters it resembles *D. eximea*, another Sanderian introduction, described by Mr. Hemslay in 1893, but it differs from that species in having larger flowers of a deeper shade of rose-red and conspicuously blotched with yellow in the throat. The leaves are elliptical, about two inches long, the petiole half an inch long. The flowers are in loose cymose racemes. Messrs. Sander say that it grows and flowers with unusual freedom. *Dipladenias* have been brought into prominent notice in recent years through the introduction of several fine species, one of the best of them being *D. atropurpurea*, which, by the

way, is happier when grown in an intermediate temperature, the flowers being richer and deeper in color and the plants healthier than when grown in stove along with those of the *D. amabilis* type.

BEGONIA GLOIRE DE LORRAINE.—This is now the most popular Begonia in England. It is one of the latest of the hybrids raised from *B. Socotrana*, and is probably the most decorative. Plants of it have been shown at exhibitions, and are offered by nurserymen, which are simply balls of rose-red flowers, and they will continue to flower freely all through the winter. It is happiest when grown in a warm greenhouse, the tubers started in April and potted in light rich soil in five-inch pots. A position on a shelf near the roof glass is best for them. By October they form compact little bushes a foot in diameter, the leaves small, obcordate, dark shining green, and the flowers in loose racemes from almost every branchlet. It was raised by Monsieur Lemoine from *B. Socotrana* and *B. Dregei*, and was first noted in *GARDEN AND FOREST*, vol. v., p. 244, fig. 48. Some growers who have essayed its cultivation have given it up as being weak and "miffy," but when properly treated it is neither the one nor the other. London nurserymen say it sells better than any winter-flowering Begonia grown.

KNIPHOFIA NELSONI.—This plant has again flowered freely at Kew, and its flowers have extended into the cold season longer than any of its congeners. It has narrow, bright green foliage, freely produced, and tall, elegant scapes, three feet or four feet high in some cases, the flowers being bright scarlet. It has stood several winters in the open air at Kew. Herr Max Leichtlin, to whom Kew is indebted for this plant, writes that it was introduced a few years ago from the South African Republic. Opinions at first varied as to its value, one well-known horticulturist condemning it as poor in color and thin in spike. At Baden, however, it is the most free-flowering of all the species; "it is elegant, not too large, flowers very late, and the flowers are bright scarlet. It surpasses *Kniphofia Macowani*, and I am convinced it will become a favorite when better known." Last year we lifted some *Kniphofias* that had pushed up spikes late in the autumn and planted them in pots to bloom in the conservatory in winter, a use for which these plants are well adapted.

ECZEMA FROM HYACINTHS.—The ban of the scientist has been placed upon the common Hyacinth, which is said to produce eczema in persons handling and cleaning the bulbs, the raphides from the dry scales, which are easily dispersed by rubbing, entering the skin and causing irritation and soreness. These raphides are needle-shaped crystals, the largest of which are one-hundredth of an inch in length, and are arranged in close bundles in the scales, those of the Roman Hyacinth being the most virulent. Evidently, this irritation is experienced only by very few of the many persons who handle Hyacinth-bulbs, a similar case being that of *Primula obconica*, which, in some persons who handle it, causes a form of eczema. The Poison Vine, *Rhus Toxicodendron*, has the same character. Examples of the scales and raphides of the Hyacinth were recently exhibited before the Linnæan Society, and Dr. Scott described some experiments he had made which tended to confirm the belief that irritation of the skin was caused as described.

CHRYSANTHEMUMS.—Our National Society grows in strength and importance, and the great annual exhibition, held under its auspices in the Aquarium at Westminster a few days ago, was, no doubt, the most wonderful display of the Chrysanthemum in all its phases ever seen in this or any other country. The usual drawbacks inseparable from the Aquarium accompanied the exhibition, and one examined the flowers amid the din and shrieks of those who had fat women, boxing kangaroos, dancing elephants and similar wonders to show. There is, however, some hope that a revival of the effort to secure a suitable Floral Hall for London will result in a better state of things before long. Meanwhile, we have all the wonderful Chrysanthemums grown with mar-

velous success and exhibited to thousands whose interest in horticulture is limited to these plants. Japanese varieties were exceptionally fine this year, the most striking, perhaps, among the newer ones being Australian Gold, Mademoiselle A. Galbert, Madame Carnot, Australie, Nyanza,

incurred Chrysanthemum are anxious for its position. According to Mr. Cannell, the Japanese varieties were looked upon as curiosities in 1869, the loose, ragged character of the flowers being considered monstrous and ugly. It is also remarkable that at that period the Japanese varie-



Fig. 70.—*Lonicera sempervirens*.—See page 496.

Mrs. J. Lewis, Simplicity and Madame M. de Proli. The popularity of incurred varieties is evidently on the wane with exhibitors, and even that beautiful variety, Queen of England, which has reigned supreme since 1847, was so poorly shown this year that old-fashioned admirers of the

ties did not properly develop their flowers till about Christmas. Is the change in the time of flowering due to breeding for early varieties or to a difference of cultural treatment? Cultivators nowadays declare that by skillful methods it is possible to produce Chrysanthemum flowers

during any month of the year. In all parts of the country exhibitions have this year been large and generally a success. Even our provincial botanic gardens and public parks grow enormous numbers of these plants and make a special feature of them.

ANTHONY WATERER died on November 16th, in his seventy-fifth year. He was one of England's greatest nurserymen, no man having done more than he to further the cause of horticulture by the introduction and distribution of first-rate hardy trees and shrubs of all kinds. He raised most of the best of the hardy Rhododendrons and Azaleas, and so exacting was he that even seedlings which others voted excellent would be destroyed by him on account of some slight defect of habit or color. His nursery at Knap Hill, in Surrey, has long been famous for its rich collections of hardy plants, and his exactitude in respect of the names and quality of his plants and care in transplanting them won him the confidence of buyers, not only in this country, but in Continental and American countries also. He had all the pride and a fair share of the prejudices of a successful Englishman of the old school, and just as a plant to be called "good" by him had to be of very clear merit, indeed, so likewise in his judgment of men was he severe, and to be called "respectable" by Anthony Waterer was the highest compliment. His knowledge of hardy plants was exceptional, for he knew them not only by name, but their history in horticulture also, as well as their capabilities in the garden or park. Many plants in his nursery he kept solely out of love for them. The collection of Rhododendrons and Azaleas at Knap Hill is probably the most extensive and richest in the world. Many of the specimens are of enormous size. In the rich peat-soil of this nursery they grow and flower with a vigor and profuseness not to be equaled elsewhere, so that in their season, June, thousands of horticulturists and others visit the nursery to see them in bloom. For many years a large collection of big specimen Rhododendrons from Knap Hill has been an annual feature in Hyde Park, London.

London.

W. Watson.

New or Little-known Plants.

Lonicera sempervirens.

EVERY one who loves a northern garden knows the scarlet Trumpet Honeysuckle, which grows naturally in low glades from southern New England and Indiana southward, and has been a popular garden plant from time immemorial. There is a light yellow-flowered form of this plant which is attractive; and another form is figured on page 495 of this issue. This is the plant cultivated in gardens as *Lonicera fuchsoides* (not the Chinese *Lonicera fuchsoides* of Hemsley). From the common type of *Lonicera sempervirens* it only differs in its rather dwarfer habit and in its slightly broader corollas, which are borne in denser clusters of more numerous flowers. The origin and history of this plant are unknown to us, but whether it is a wild form picked up in the woods and propagated by some intelligent cultivator, or a nursery seedling, it is one of the most beautiful of all hardy climbing Honeysuckles.

Our illustration is from a drawing made by Mr. Faxon in the Arnold Arboretum.

Isoloma Jaliscanum.

THE genus *Isoloma* is represented in most gardens. The species are grown for their showy blossoms and their handsome foliage, and *I. Jaliscanum* is among the most striking of them. For the past five or six weeks this plant has been flowering in a warm greenhouse and has attracted much attention. The plants in bloom here were raised from seed taken from dried specimens in the Gray Herbarium about eighteen months ago. The seeds are small and require careful treatment until they germinate. When the plants are large enough to handle they may be pricked off into small shallow pans, using a compost of

finely sifted soil mixed with leaf-mold and sharp sand. The seedlings may be placed in a position where they can get plenty of light, but must be shaded during the hottest part of the day. When they are about one inch high they can be potted off singly into small pots and potted on afterward as they need it. The plants are about eighteen inches high and are well branched, and the bright scarlet flowers are produced in umbels on the upper part of the branches, and although the individual blossoms do not last very long, yet the flowers appear in succession, so that the plants, in their season, are never without a number of flowers. The plants blossomed last spring, but not so profusely as they have done now. As far as I know, this handsome *Isoloma* has not been grown elsewhere; and, judging from its behavior here, I think it will be a valuable addition to our warm greenhouse plants. It is a native of Mexico, and was collected by Dr. Palmer on the Rio Blanco, Jalisco, and was described by the late Dr. Sereno Watson. Perhaps, as this plant is little known, Dr. Watson's description would not be out of place here:

Stems herbaceous or somewhat woody at the base, decumbent, about a foot high, pubescent throughout; leaves opposite, oblong-lanceolate, short-acuminate, rounded or acutish at base, serrate, one to three inches long, shortly petiolate; peduncles axillary, one-half to one inch long, bearing an umbel of two to four flowers on pedicels becoming one-half to one and a half inches long; calyx-lobes acuminate, four to six lines long in fruit; corolla an inch long, scarlet, pubescent, nearly straight, cylindric-funnel form, moderately dilated upward, and throat but little contracted; capsule turbinate-oblong included.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

Cultural Department.

Greenhouse Plants.

STATICE HALFORDI is the garden name for a hybrid form of *S. macrophylla*. It is an old greenhouse plant, a native of Teneriffe, and was introduced to English gardens in 1828. It is seen occasionally, but not as frequently as it should be. Old plants are subject to stem-rot, and since few, if any, side shoots are thrown out, the plants often have a scraggy appearance; this, together with the fact that it is slow and uncertain of propagation by ordinary methods, is a sufficient reason, no doubt, why it is so seldom met with. Plants a year old are of the most serviceable size. By allowing cuttings a long time to callous in a cool propagating bed I have raised them in this way, but have usually had more success by layering. Old plants may be shaken out and an incision made in the stems just below the leaf-growth and planted out for the summer. I find they do well in any common garden soil, and if buried below the incisions most of them will have struck root at these points, and may be potted into separate plants. A friend of mine who gave me the idea always plants his in the Asparagus bed, considering shade essential. I prefer to use undersized pots and light soil, with some charcoal incorporated. Excessive moisture at the roots is fatal. The sinuate shining leaves are nearly all radical, or tufted on short, scarious stems. The flattened, leafy compound panicles of white flowers arise from the junction of two divergent crowns. The corollas are papery in texture and extremely fugacious. It is seldom we see more than half a dozen flowers open at a time. The deep blue and persistent involucre-like bracts form the most conspicuous part of the inflorescence, lasting for the greater part of the winter. Even when pot-bound these Statice can be kept vigorous by the use of manure-water and produce a surprising amount of bloom.

Poinsettia, or botanically *Euphorbia pulcherrima*, is among the showiest of winter-blooming plants. About this time of the year they are a great feature in Covent Garden Market, London. A specialty is made of them in many places in the neighborhood, and their cultivation confined to a limited purpose, that of producing single heads of bloom on as short stems as possible. Much skill is required to do this, and often a whole batch will be re-rooted as late as September. If done successfully it will not be uncommon to see heads of deeply colored leaf-like bracts, a foot or more in diameter, on stems not more than eighteen inches long. If not subjected to this treatment the stems would grow, in many plants, to more than six feet in height. Poinsettias are considered invaluable for church decoration during Christmas-time. Summer-struck cuttings

make the best heads. Old plants become branched, and, though they make a brilliant show when massed, are less striking singly. The cultivation, beginning with the end of the blooming season, consists in following the conditions imposed by nature. The plants are given a rest during winter-time by withholding water to less than half the usual amount until spring. When warm weather sets in they are pruned back and planted out-of-doors. Fresh growth commences, and as soon as the shoots are a few inches in length they are taken off with a heel. As long as cuttings are made the propagating-bed is kept in use, so that we get a collection of different sizes, the smaller plants being as serviceable as the larger ones. Better success is obtained when cuttings are taken with a heel, as the stems are hollow above and bleed profusely when cut. In a moderate hotbed, cuttings root in two or three weeks. Very careful handling is necessary, as the tender roots are easily injured, and therefore in many places the cuttings are put separately in small pots. For the best results it is advisable to con-

five-inch pots fully five feet tall, just coming into bloom, and as handsome as a picture, standing on the park and overhanging a bank of Ferns. Our plants of last year were strung on wires, and bloomed profusely all winter long. They were left there, rooting through the pots into the gravel-bed, and the whole now forms a perfect hedge. We take cuttings during early spring. The after-culture does not differ from what we give other plants, although the experience of other growers would show that a little artificial heat, such as we have during the autumn, is essential.

Wellesley, Mass.

T. D. Hatfield.

Greenhouse Plants in Flower.

ARISTOLOCHIA ELEGANS has been in flower in the Palm-house for the past two months, and from present indications seems likely to flower two months longer. It is one of the handsomest, though not the largest, of the genus.

The flowers are produced singly in the axils of the leaves on peduncles about six inches in length. The tube of the inflated perianth is shorter than in most of the species and of a yellowish green color. The limb is oval, about five inches long by three wide, and beautifully marked with rich brownish purple veins on a white ground color. The leaves are heart-shaped, on slender petioles and of a light green color. Though this species is usually considered a spindling or weak-growing climber, suitable for pillars, etc., if given liberal treatment in the matter of soil and temperature it will grow almost as rapidly as an Allamanda. Our plant has covered more than a hundred square feet of glass since last August. It is planted in a compost of good turfy loam, with some well-decayed stable-manure incorporated, and a liberal allowance of room for its rambling roots. As the flowers are all borne on the new growth, it is necessary to prune back rather severely, or say within two buds of the old wood, after the present season's growth has thoroughly ripened, so as to insure plenty of fresh wood the following season. This species is a native of Brazil and may be propagated either by seeds (several pods of which have ripened with us) or by cuttings of the half-ripened wood inserted in the propagating bed.

Wissadula rostrata, a tropical Malvaceous plant, is now in flower in the Palm-house. It is a rather tall plant, with alternate cordate leaves six inches long by five wide, on rather long petioles. The flowers are small, white, with yellow stamens, and are borne on axillary racemes which become crowded toward the summit of the plant. The seeds from which this plant was raised came to us under the name of *Abutilon Leschinaultianum*, though the resemblance of the flowers to those of an *Abutilon* seems rather obscure.

Pentas carnea, a tropical African plant, is also in flower in the same house. The flowers resemble those of the *Bouvardia*, and to which it is closely related. They are of a delicate pink color and are borne in erect terminal clusters. The opposite leaves are

downy, lanceolate in outline, five inches long by two wide. The plants have a dwarf bushy habit and may be propagated either by seeds or cuttings. This plant is not as useful as the *Bouvardia*, because the flowers are not as freely produced, and since they are borne at the summit of the main stems they cannot be cut without injury to the plant.

In the intermediate house *Salvia involucrata* has been producing freely its handsome racemes of soft rosy-pink flowers. They are borne on stems a yard long, well clothed with leaves of the brightest green, so that it is a most desirable plant for decorative purposes. *S. rutilans* is equally handsome, with flowers of a deep Cardinal red, and has often been mistaken by visitors here for the Cardinal flower, *Lobelia cardinalis*. *S. leucantha* is another very desirable species producing terminal racemes of soft lilac-colored flowers. These *Salvias* are of the easiest culture. We propagate fresh plants each year from sucker cuttings about the end of February. As soon



Fig. 71.—The Western Larch (*Larix occidentalis*).—See page 491.

tinue the young plants in a slight bottom-heat, as they start into fresh growth more quickly, and in this way gain more substance and strength for abundant flowering in their season. Still, without artificial heat of this character, they grow into good plants during the warmer months of late summer. A little fire-heat when the nights begin to get cool will tend to a healthy condition of the roots. Lack of vitality in this direction will quickly show in the loss of foliage and the comparatively lessened size and brilliancy of the bracts. A light, rich soil, with charcoal as an ingredient, is a suitable compost, and six-inch pots are the largest that should be used. It is better to finish the plants with liquid-manure than to shift them into larger sizes.

Euphorbia fulgens is another showy member of the same family, but considerably more flexuous in habit. Its bracteate appendage resembles more an involucre, and, instead of being disposed in leafy heads, occurs in little tufts of two or three all along one side of the leafy branches. We have a number in

as the weather is favorable they are planted in almost any open position, where they remain till September, with but little attention except in the matter of pinching to keep them bushy. They are potted about the second week in September and placed in a shaded position for a few days and finally removed to the house in which they are intended to flower. They are of Mexican origin, and considering the little trouble in growing them they are among the most satisfactory fall-blooming plants we have.

Oxalis Ortgiesii, a Peruvian species, has been flowering in the same house for the past six weeks. It is a woody-stemmed plant, about eighteen inches in height. The forked cymes of bright yellow flowers contrast strongly with the copper-colored trifoliate leaves, and well-grown plants are very useful for decorative purposes.

Camellia Sasanqua is now in flower, and a beautiful species it is. The flowers are single, three inches in diameter and borne abundantly. They are of a lovely pink color, and their orange-colored stamens suggest a wild Rose. They have also a delicate fragrance. The leaves of this species are much smaller than those of the well-known varieties of *C. Japonica*, but the cultivation is the same.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

The Pear Slug.

PEAR-TREES have been severely injured in some portions of Delaware by the larva of this insect, *Eriocampa cerasi*, during the past season. This slimy, dark green slug eats the soft tissues of the leaves, leaving the coarser veins, and the mutilated foliage dries up and falls in midsummer. The insect can easily be checked by sprinkling the trees with air-slaked lime, or pyrethrum, or hellebore, can be applied dry or in water. Road-dust has often been used with success, the efficiency of its action depending on each slug receiving a coating of the dust, which stops up its breathing apparatus and causes its death.

The effect of the defoliation of a Pear-tree in midsummer extends further than the immediate loss of its leaves. The dormant buds, which normally produce the foliage and flowers of the coming season, may push forth and cover the tree with a new foliage in August or September. Then a new set of buds are developed on this late growth to provide leaves for next year, and these buds are necessarily weak and undeveloped, and result in a feeble growth. This extra effort on the part of a tree, after its growing period is practically over, is a devitalizing process, and if continued three or four years may result in its death. I know of one valuable bearing orchard that was quite destroyed by this pest in three years. Several young orchards have come under my notice which have gone, or are rapidly going, the same way.

Experiment Station, Newark, Del.

G. Harold Powell.

Correspondence.

Aquatics in California.

To the Editor of GARDEN AND FOREST:

Sir,—Some time ago Mr. Watson, in one of his instructive letters, gave your readers an account of the effect of high temperature on hardy *Nymphaeas* in England. Mr. Tricker has told of the behavior of both tropical and hardy varieties in New Jersey during a very hot summer. A few words from a southern water-garden may, therefore, not be out of place. Southern California is in the same latitude as the state of South Carolina. In the minds of most residents of the eastern states, latitude thirty-four degrees is associated with the idea of an extremely hot summer. From sixty to one hundred miles inland summer days in this part of California are often hot, but along the coast the temperature is much more agreeable than that of the Atlantic coast during the warm season. No one can understand the climate of this region without actual residence here. The newly arrived visitor who is interested in plant-growth is constantly meeting with surprises. He will see a multitude of trees, shrubs and vines from semi-tropical regions, and by their side an equally great number of plants which endure many degrees of frost in the east.

In favored spots like the Cahuenga Valley one may see a small plantation of Pineapples producing a moderate supply of fruit, an orchard of Cherimoyers, and some bearing trees of the Alligator Pear, while in the immediate vicinity most deciduous fruit-trees, such as the Apricot, Peach, Plum and Pear, flourish and bear luscious and abundant fruit. With partial shade or a northern exposure such plants as Pansies and Tuberous Begonias flower freely in midsummer.

In the water-garden hardy *Nymphaeas* take very kindly to this climate. *Nymphaea Marliacea chromatella* flowers for more than seven months, and is as fine color in midsummer as at any time. *N. Marliacea carnea* the past summer has been superb, producing flowers seven inches across, of the most lovely flesh-color, while the variety *Rosea* has also been true, with flowers quite as deep in color as those of *N. odorata rosea*. *N. odorata* and *N. odorata rosea* have the same failing here as in the east, a rather short period of bloom. *N. odorata Caroliniana* is an exception, however, as it produces its lovely tinted blossoms as late as *N. candidissima*.

The tropical varieties bloom very profusely for a long period, but owing to the cool nights neither flowers nor leaves are quite as large as in the east. The same may be said of the *Victoria regia*, if grown without artificial heat. I have found *N. gigantea* a difficult plant to grow here, but a gentleman in Alameda County, who has a water-garden fed by a hot spring, writes me that it flowers finely with him every day in the year. I have several forms of *N. Zanzibarensis* which are interesting. One is a delicate porcelain blue, a very pleasing shade. This is the result of an attempt to cross the variety *Azurea* with *N. dentata*. Another form of *N. Zanzibarensis* has bright blue flowers, with the base of each petal nearly white. I have also a plant of *N. Zanzibarensis rosea* which uniformly bears flowers having five sepals and an increased number of petals, their color approaching salmon-pink, with no trace of violet as in most forms.

The hybridist who takes Water-lilies for his subjects has many failures. The bees are often more successful. I find it impossible to get seed of *Nymphaea gracilis* true to color if the plants are growing near the Zanzibar Lilies, unless the flowers are protected from insects. I have flowered for two seasons a seedling of *N. gracilis* which is undoubtedly a cross between it and the Zanzibar Lily. The flowers are bright violet-blue, with purple stamens and petals, intermediate in width between those of the two parents. I call it *N. gracilis violacea*. *N. gracilis rosea* is another chance cross between *N. gracilis* and *N. Zanzibarensis rosea*. Its flowers also have a tone of salmon mingled with the pink, and the stamens are dark yellow and pink. Of the failures which often attend the efforts of the hybridist two instances may be given: Some years ago I fertilized a flower of *N. Zanzibarensis* with pollen of *N. Sturtevantii*. An abundance of perfect seed was the result, but on flowering the seedlings not one of them was affected by the male parent. All turned out to be *N. Zanzibarensis* of varying shades of blue. Some time ago Mr. Watson, in one of his letters, spoke of the desirability of crossing the night-blooming varieties with some of the day-blooming tropical ones. Following this suggestion, three years ago I succeeded in getting ripe seed of *N. dentata* fertilized with pollen of *N. Zanzibarensis*. The seedlings in a young state had leaves of a rich wine-color, but when they came to flower were all *N. dentata*, pure and simple. These were cases of the prepotency of the female parent surely.

Nuphar polysepala is the Pacific coast representative of the Spatter-Docks of the eastern states. The plant is a strong-growing one, but not more so than the form of *N. advena* which grows in the Delaware River at Bordentown, New Jersey. The flowers, however, are two or three times the size of the eastern species, being three and a half inches or more across and of a deep golden-yellow color. The plant would undoubtedly be hardy in the east, and is well worthy of a place in a large water-garden or natural pond.

At this writing (the middle of November) the tenderest of the tropical Lilies have about finished their blooming. The Zanzibar varieties and *Nymphaea chromatella* are still producing a few flowers. *Aponogeton distachyon* flowers freely from September to May.

Los Angeles, Calif.

Edmund D. Sturtevant.

Chrysanthemums Out-of-doors.

To the Editor of GARDEN AND FOREST:

Sir,—Perhaps no other flower fits in so well with the indoor arrangement of our homes as the Chrysanthemum, or has a more distinctly decorative and artistic effect according to modern ideas in combination with house furniture and hangings. Many of them are graceful in pose and come in so many odd colorings that varieties may be found to harmonize with almost any of the rich or subdued tints used in modern interiors. Out-of-doors they are quite another thing, and their proper place in landscape-gardening is a problem which I have not solved. Certainly they look like nothing native to our fields and forests. They do not at all resemble our wild Asters and Golden-rods, which give the distinctive floral

touch to our autumn scenery. A garden of Chrysanthemums has a decidedly foreign aspect, and yet my own outdoor collection of these flowers is giving, and will probably continue to give, me great pleasure. Nevertheless, I sometimes question whether my bright borders do not create some disturbance in the autumn landscape. My Chrysanthemums bloom luxuriantly long after the trees are leafless and often after the ground has been whitened with the earliest snow. They have for company many shrubs that bear bright berries, and for foil and background masses of evergreen bushes. The effect is bright and cheerful in dark November days, when cheerfulness and brightness are doubly prized. But it is unlike anything else in nature; the flowers look strange and out of place with their setting of dead forest leaves and dark evergreen foliage and naked Oaks. They are planted in an out-of-the-way border, which is screened from the house by a little rising ground, and so are not constantly asserting themselves to one who looks over the grounds from porch or window. We take frequent walks to them, however, and are always glad to find them alive and shining amid the evidences all about them that the year is dying.

Of one thing I am sure, and that is that a great deal of care must be used to arrange the plants to the best advantage. Their cultivation in this climate presents no difficulties, but their proper arrangement as to color demands study. On the 14th of November I saw a small garden where more than a hundred and fifty varieties of Chrysanthemums were well grown in the open air. Most of these were of the larger-flowering type, though there were some Pompons and Anemones, but reds, mauves, pinks, oranges, crimsons, whites and saffrons were all in a jumble, without any attempt at artistic adjustment. The effect was bizarre in the extreme and wearied the eyes, until the observer longed to uproot them all and try to bring some order out of the chaos by judicious grouping. Why should we not be quite as much offended by a conjunction of discordant colors in our gardens as the neat housekeeper is by disorder and lack of harmony in her drawing-room?

A proper arrangement of Chrysanthemums is a most useful exercise in producing harmonies of color. The pink varieties are at one end of my border as far removed as possible from the brick-dusty, reddish and orange-colored ones; yellows are good in a mass by themselves, and whites may be judiciously used to tone down and soften the whole effect. But these are the simplest elementary rules in an art whose refinements are of fascinating interest. I am sure that any reader of GARDEN AND FOREST who is learned in the subject of colors and Chrysanthemums could gratify many flower lovers by recounting experience in combinations for effect, with a list of good varieties, new and old, for cultivation out-of-doors.

Rose Brake, W. Va.

Danske Dandridge.

Recent Publications.

Economic Entomology: For the Farmer and Fruit Grower and for use as a Text-book in Agricultural Schools and Colleges. Illustrated. By John B. Smith, Sc. D. Philadelphia: J. B. Lippincott & Co.

The people for whom this book was prepared certainly need precisely the kind of instruction which it contains. The fruits and crops of orchards and fields are attacked every year by insect pests, and unless the cultivator knows how to rout these countless foes his year's labor may be lost. Indeed, let him do what he will these depredators will surely take a considerable fraction of one crop or another in the course of every year, and it is not an exaggeration to speak of the damage to the agricultural products of the country as estimated in millions of dollars. The entomologists in our experiment stations and colleges have been doing a great deal of careful and practical work in this field for several years past, and the literature which is abundantly scattered about in leaflets and reports contains about all that the farmer or fruit grower needs to know on this subject. Professor Smith has selected from all this material all that is essential for systematic instruction, and guided by his own experience as an investigator, as a teacher, and as a practical worker in many campaigns, he has made an admirable manual. A systematic treatise on insects, in which their characteristic forms are classified and their habits described, occupies more than three hundred pages of the book. This is preceded by about fifty pages devoted to their physiology, and it is followed

by fifty pages more specially devoted to insecticides and various means of neutralizing their attacks. In this last part not only the methods of prevention and cure are explained, but reasons for every part of the processes are plainly set forth. Practical rules are laid down with great fullness, so that no one need err in the preparation of poisonous and other compounds, while explicit directions are given as to the method and time of application, to the end that the remedies will have their best effect. The chapter entitled Farm Practice to Prevent Insect Attack is an especially valuable one. There is little need of systematic spraying with arsenic or hellebore when rubbish and weeds are allowed to grow as harbors for fresh hordes to attack the trees or crops as soon as one legion is destroyed. Prevention is better than cure, and when we read Dr. Smith's explanation of the way in which the great portion of insects live through the winter and where they hide, it is easy to see how a farm which is managed in a slovenly way may be made a capital nursery for insect pests for an entire neighborhood. How to destroy these lurking places; how to cultivate so as to make life a burden to our enemies; what crop-rotation will make it more difficult for them to gain a subsistence; how to select fertilizers which will be food for the plants and death for their foes—all these problems and many more are discussed and settled with clearness and brevity. We believe that if all farmers and fruit growers, and, indeed, all landed proprietors, should adopt these simple preventive measures a great many of the most destructive species could be permanently reduced or, at least, held in check without further trouble.

The illustrations are genuine helps to the text. Some of them are original, and the remainder are taken from the most trustworthy sources. Technical language is only used where it is necessary, so that the book can be read with understanding by any man of ordinary intelligence, and it might have a fascinating interest for girls and boys who have an inclination to the study of Natural History. It is one of the books which could be appropriately placed in the library of every district school in the country.

The tenth volume of Professor Sargent's *Silva of North America* was published on the 28th of November. It contains figures and descriptions of the arborescent species of Yucca which grow north of the Mexican boundary, the arborescent Palms of the United States, the Cupressineae and Taxaceae, and the following genera of Coniferae—Juniperus, Cupressus (including Chamæcyparis), Thuya, Libocedrus, Sequoia and Taxodium. Two additional volumes will complete the work. The eleventh, now in course of preparation, will be devoted entirely to the genus Pinus, and in the twelfth and final volume will be described the Spruces, Firs, Hemlocks, Larches and a few trees of earlier orders which have been found since the publication of this work was begun.

Notes.

The first hothouse asparagus of the season, from New Jersey and Long Island, which shows severe forcing in slender blanched stalks, costs \$2.00 a bunch.

Mr. C. G. Pringle has just returned from another botanical journey in Mexico, where, during the past season, he has secured about 20,000 herbarium specimens in the valley of Mexico and in Cuernavaca.

The first car-load of California Navel oranges was sold here last week, when the season for "deciduous" fruits from that state closed with sales of three car-loads of grapes. During the season 1,137 car-loads of California fruits were sold at auction in this city, 154 more than in 1895.

Number 2 of *Florilegium Harlemense* contains pictures and description of the single blue Hyacinth Grand Maftre, a well-known variety which is rather more desirable for borders than for forcing; three of the early double Tulips, including Raphael, with a blush-white flower as large as a pæony, the white Alba Maxima and the scarlet Vuurbaak, or Lighthouse; and three of the most distinct varieties of Polyanthus Narcissus.

A correspondent of *Meehans' Monthly* speaks in praise of our native *Ceanothus Americanus*, or New Jersey Tea, as one of the plants which make an excellent low hedge, never grow beyond bounds, and look well at all seasons. It will endure dry weather well. It puts forth leaves and stems in early spring, and is soon covered with its feathery blossoms, and when the leaves have fallen the erect red stems are still handsome. In the north the winter sometimes kills back the young growth, but, in any event, the plant only needs one shearing in the spring.

We observe that Michaelmas Daisies grown in pots have been largely used this year for the embellishment of the greenhouses at Kew. Our native Asters grow in such abundance everywhere that we never heard that the experiment of growing them under glass had been tried in this country, and yet if plants with flowers of the best form and color were selected, some of them would certainly make beautiful specimens, and, no doubt, when flowering under glass, the individual heads would be more perfect than they are when blooming out-of-doors in our windy autumns.

In a recent volume of the Linnæan Society on Orchids in the Malay Peninsula, Mr. Henry Ridley writes that in the hill forests Orchids become more abundant as one ascends, and in exposed rocky slopes as the jungle becomes thin a great variety can be found. Species which in the low country inhabit the tops of the loftiest trees, here grow on the ground or low on the stems and branches of bushes and small trees. Thus, on Kedah Peak, at about 3,000 feet elevation, the ground is thickly carpeted with plants of *Bulbophyllum*, *Cœlogyne*, *Dendrobium*, *Platyclinis*, *Eria*, etc., so that one is up to his waist in them.

In a road bulletin published last month by the Ontario Department of Agriculture it is stated that money appropriated and applied to the improvement of roads in the Dominion is rarely used under any economical system. It sounds almost like a description of the road-work in some of our states, when we read that ditches are dug without providing outlets; gravel is applied without forming the road-bed; roads are graveled without having been drained; then draining is undertaken, and the gravel is covered over with the excavated earth, which necessitates a repetition of the graveled; there is no discrimination between good material and bad for the road-surface, and it is composed chiefly of sand; temporary sluiceways are built; work is done without proper machinery; and, in short, the principles of scientific road-making are generally ignored.

Duchess, Keiffer and Lawrence pears, from this state, held over in cold storage, are still seen in collections of fruits. The brilliantly colored Forelle pears from California are the most showy fruit of this class now in season, and cost \$1.25 a dozen for the best. Comice, Winter Nelis and Sheldon bring \$1.00 to \$1.25 a dozen, and the same price is asked for Beurre Gris, a large russet pear of medium quality and an excellent keeper. Rich, spicy Winter Seckels, also from the western coast, cost fifty cents to \$1.00 a dozen. Some of the large green Spanish melons noted during autumn are still occasionally seen, at \$1.25 each. Small round melons, smooth and almost golden in color, are displayed among hothouse products in one of the fancy-fruit stores. These are from Long Island and sell at fifty cents a pound, the average weight of one of them. Prickly pears, pomegranates and immense globular shaddocks are among the more showy exhibits. Strawberries, from California, sold last week at seventy-five cents a pint. Florida pine-apples of the largest size, with luxuriant tops, sometimes lavishly decorated with broad bows of satin ribbon, make a striking show in the fruiterers' windows. These cost as much as \$1.50 apiece, and smaller fruits, also specially cultivated under shelter, sell for sixty cents and upward. Coe's Late Red, the long-keeping California plum, is yet in stock, and being the only plum in market now has a special value in giving variety to fruit baskets. Japanese persimmons are comparatively plentiful and cost fifty to sixty cents a dozen for good ones. Brilliant little Lady apples, which were never more handsome, sell for fifteen cents a dozen. Quinces are a regular offering in the markets at seventy-five cents a half-bushel basket. There is a wide choice in kinds of oranges now in season, and Tangerines, from Florida, give variety to the large range of citrus fruits.

In this phenomenal apple season, when more than 2,000,000 barrels have already been shipped from American ports and sold at remarkably low prices, the so-called Albemarle pippin, usually a principal export apple, is hardly in the trade at all, the season being an off year for apples in Virginia. The entire crop of this variety in that state is said to amount to only

about 1,000 barrels, and the quality is not up to the average of other years. A wholesale dealer here, who makes a specialty of this choice fruit, has this year handled but one car-load of 221 barrels, whereas his trade last year comprised 30,000 barrels. York Imperial, another American favorite in the English markets, is not seen at all this season. An average price for Albemarle pippins in England a year ago was \$4.00 at wholesale, quotations ranging from fifteen to twenty-five shillings. The few barrels now for sale here are held at \$8.00 at retail, and as much as thirty-four shillings was realized at wholesale auctions in Liverpool several weeks ago. Newtown pippins, of which the Albemarle pippin is generally considered a synonym, are fairly plentiful in the Hudson River district. Barrels of this northern apple, which is a better keeper than the southern fruit, sell here at \$6.00 for the best, but much of the stock is inferior, and the prices for lower grades are no higher than for ordinary varieties of apples. In Liverpool tightly packed barrels of selected Newtown pippins brought thirty-two shillings, in wholesale lots, at recent sales. The cold weather a week ago urged many shippers to hurry apples forward from the interior of this state so as to save them from freezing in transit, and the result was an overstocked market and a further drop in values. A fair wholesale price at warehouse stations is eighty cents a barrel by the car-load, while ordinary quality apples bring but sixty to seventy-five cents, and the best \$1.25 to \$1.35. The barrels cost twenty-five cents, freight from points in this state about as much more, with fifteen cents for packing and ten cents for commission, all of which the grower pays, so that the only gain in an unprecedented crop seems to be to the consumer, especially if he buys by the barrel. Choice apples cost the retail buyer \$1.50 a barrel and upward. The storage houses have been crowded with apples, and new warehouses have been built, but thousands of bushels are unhoused, although every available cellar in the apple districts has been pressed into use. In the township of Greece, New York, for example, the apple crop amounts to over 200,000 barrels. There are ten drying houses and five cider mills in the town, and almost a thousand men and women engaged in this work, though the total population is only about 4,000.

Ernest Gustavus Lodeman, Instructor in Horticulture in Cornell University, and Assistant Horticulturist to the Cornell Experiment Station, died by his own hand during an attack of acute melancholia in Mexico, Oswego County, New York, on the 2d of December. Mr. Lodeman was born in Neufchatel, Switzerland, on May 3d, 1867. When he was two years old his parents came to this country, and in 1870 his father became Professor of Modern Languages in the State Normal School of Michigan, from which institution the son graduated in 1889. In 1890 he began in Cornell University the professional career which proved remarkably useful and fruitful. In 1895 he received the degree of Master of Science from the university, and his thesis, "The Spraying of Plants," was subsequently published as one of MacMillan's Rural Science Series, making a book of some four hundred pages. At the date of his untimely death he was a candidate for the degree of Doctor of Philosophy, having taken up for his thesis a philosophical and botanical study of the cultivated Begonias, and he had collected a greater number of species and type forms of the genus than exists in any other American collection. In the college he had particular charge of classes in the propagation of plants, spraying, greenhouse construction and pomology. In connection with the experiment station work he prepared many important bulletins, and the spray-calendar idea which originated with him is now an established type of publication. When the station was asked to extend its work directly among horticultural communities Mr. Lodeman threw himself enthusiastically into the work and soon became a personal favorite among the fruit growers of western New York. All the work upon grapes and strawberries, two large industries in the state, was entrusted to him, together with the treatment of certain plant diseases. His last journey made to Oswego County was to inspect experiments in fertilizing strawberry fields, and here under some impulse induced by the strain of overwork he met his tragic end. Personally, Mr. Lodeman was tall and well-knit, and he usually enjoyed excellent health. He had the modesty and patience of the true student, and although at times he felt a depressing distrust of his own ability, he was prosperous and happy in his work. He was an excellent linguist, speaking French and German fluently and having a useful knowledge of other languages. His private life was spotless and he had a sweetness of temper and true manliness of character which endeared him to all with whom he came in contact.

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Municipal Playgrounds.

DURING the last twenty-five years the movement of population has been from the country to the city, and the rapidity with which American and European cities have increased in size during this period is marvelous. This movement has been even greater in Europe than it is in America, although we are apt to regard the growth of some of our western cities as unparalleled; and in Europe, at least, the effort to improve the condition of urban populations has kept pace with their growth. The last ten or fifteen years have witnessed substantial reforms, too, in the management of American cities, and if these efforts toward reform have not always been successful their failure can be largely traced to political conditions rather than to want of zeal and intelligence in the reformers.

In modern municipal equipment much provision is made for the instruction and amusement of children, and in most modernized European cities large sums of money have been expended in procuring open spaces for them in districts of congested population. Mr. Albert Shaw, in his *Municipal Government in Great Britain*, in describing the methods and results of modern London management, points out as remarkable "the manner in which the committee on parks has made provision for the athletic culture of young Londoners of both sexes, and for their natural and healthful devotion to outdoor sports. Cricket-grounds and football-grounds, literally by the thousand, have been laid out, besides many hundreds of tennis-courts, and various golf and hockey grounds. The council committee has not merely provided these opportunities for recreation, but it has gone so far as sedulously to supervise the use of the cricket grounds and other playgrounds, to the end that the largest possible number of young people may get the best attainable results of pleasure and physical development from their use. The council has imitated the Continental cities in making provision for music in the parks, and its numerous subsidized bands are giving more than a thousand open-air concerts each season. It has succeeded in making the parks so attractive that several mil-

lion persons each year are now deriving pleasure either from participation in the games, attendance at the concerts or in other similar ways. The preservation of several very large outlying tracts of wooded park land, together with the opening up of numerous larger and smaller public pleasure-grounds in every district of the huge metropolis, has now made it certain that the growth of London can never shut off the children of future generations from access to the grass and trees and open-air sports"; and from his work on the *Municipal Governments of Continental Europe*, it may be learned that in modern Paris and Berlin, Vienna, Hamburg and many other German cities, abundant provision has been made for the recreation and refreshment of all classes of people in numerous and carefully located small parks, squares, playgrounds and other open spaces.

In this country, where much has been done in the last forty years in providing our cities with large rural parks, the establishment of playgrounds in connection with urban schoolhouses, and small parks or playgrounds in congested districts, has been singularly neglected. In this city, however, two admirable small parks have recently been opened in the most crowded parts of the East Side, the land for others has been taken, and New York has legislative authority to expend a million dollars a year for this purpose. Two completed East Side parks at Mulberry Bend and Corlear's Hook are, however, small parks and not true playgrounds—real oases in a veritable desert of squalor, with fresh green grass and trees and flowering shrubs. Green grass is always beautiful, and in the midst of a tenement-house district it is doubly refreshing; but children cannot play on turf without destroying it, and if these parks are to be kept fresh and green the edict to keep off the grass must be sternly enforced; and it is a question worth the attention, perhaps, of municipal reformers whether open spaces in such districts would not better supply the public needs if a large part of their surface was covered with gravel or asphalt on which children could play freely, the grass and trees being confined to a narrow marginal border.

What has already been done in this city in providing open spaces is, of course, still very inadequate, but it is more than has been accomplished in any other large American city. Brooklyn has a noble playground of forty acres of beautiful level turf beyond Prospect Park, but it is still remote from the centres of greatest population, and little has been done to secure open spaces in the heart of the city or to provide for them on its rapidly advancing borders. This is true, too, of Philadelphia, Chicago, Baltimore, St. Louis and San Francisco. These cities are now admirably provided with large parks and with grass-covered squares, but no adequate provision has been made in any of them for convenient playgrounds for the children of the poor. Boston and its suburbs, judging by the ratio of park area to population, is the best parked community in the world, but in the great park system of the New England capital little attention has been paid to the question of playgrounds. The city itself has spent in a comparatively short time \$12,000,000 on the city parks. It has one admirable large playground in Franklin Field, situated, however, in what is now a remote and comparatively inaccessible district, beyond walking distance for a majority of the school-children of the city, and between the Common, now too small and too much used to serve as a playground, and Franklin Park, a distance of about seven miles through the parks, no provision whatever has been made for playgrounds. This serious objection to the Boston park system may, however, still be remedied, and Mayor Quincy, who is alive to the importance of this subject, will, it is to be hoped, make his administration memorable by inaugurating a general system of conveniently located playgrounds and open spaces. The little town of Brookline, which is adjacent to Boston on the south-west, has already set a good example by placing \$100,000 in the hands of its Park Commission to secure land in the less thickly populated parts of the town for the benefit of future generations of children, the more densely populated districts

being already provided with three large and excellent playgrounds adjacent to some of the principal school-houses in the town.

Other cities and towns may well follow this example and secure now, while land is comparatively cheap, an adequate provision of open spaces for the future. All our cities, large and small, will increase rapidly in population, and land within their borders, or in their immediate neighborhood, adapted to the purposes of parks and playgrounds will never be cheaper than it is now. A wise policy will make such provision in advance of the actual necessities of the community, and in laying out the new districts of all cities land should be liberally secured for these purposes.

The growth of cities at the expense of the rural population will make the supply of country-bred men and women, who in the past have been the mainstay of the nation, smaller and more difficult to obtain; and the men and, what is even more important, the mothers of the men who are going to carry on the American experiment of self-government will be city boys and girls. Too much, therefore, cannot be done to make them healthy, clean and well instructed, and unless they are supplied with fresh air and with opportunities to play in freedom the games which belong to their age their chances of becoming useful citizens are not promising.

DR. AUGUSTINE HENRY, writing from Mengtse, Yu-nan, contributes an interesting and important paper to the *American Druggist and Pharmaceutical Record* on Chinese Soap-trees. From very early times the fruits of these trees have been used by the Chinese for washing purposes, and, in spite of the introduction of alkaline soaps from England and Germany, they are still esteemed for washing the hair and cleaning delicate fabrics like silk. Little is known of the chemistry of these fruits, although it may be assumed that their peculiar properties are due to the presence of saponin. Chinese Soap-trees belong to two natural families, the Sapindaceæ and the Leguminosæ. The best known, perhaps, of these plants is *Sapindus Mukorossi*, a Chinese and Formosa tree cultivated in Japanese gardens and in those of north-west India and Bengal. Dr. Henry tells us that this tree is common in the southern provinces of China and in the islands of Hainan and Formosa. Further north it occurs in Chekiang and Hupeh, although it is rare in these provinces. The fruits of all the trees of this genus have the same properties, two of them growing spontaneously in the United States, one on the keys of southern Florida, while the other is widely distributed along the southern boundary of the United States from south-western Missouri southward. The fruit of *Pancovia Delavayi* resembles that of *Sapindus*, and is also used as soap, according to the French missionary Delavay, by whom it was found in Yu-nan a few years ago. The most esteemed of the Chinese fruit-trees, however, is *Gymnocladus Chinensis*, a near relative of our own Kentucky Coffee-tree. This tree grows in central China in the provinces of Hupeh, Szechwan and Anhui, Chekiang and Kiangsi. The Chinese name, *Fei tsao*, meaning fat *Gleditschia*, refers to the fact that the pods of this tree are much thicker than those of the true *Gleditschias*.

Eastern Asia must be considered the home of this last genus, eleven species or forms being known in the forests of that region, while in North America there are only two. The pods are employed in Asia for washing, and those of *Gleditschia officinalis* are used as a drug by the Chinese. As Dr. Henry points out, there is at present considerable confusion regarding the different species of Asiatic *Gleditschias*, and a monograph of the whole genus is very much to be desired.

The Lungngan-tree (*Nephelium Longana*) occurs wild in Formosa and is cultivated in that island and in southern China for its edible fruit. The seeds are ground into powder and are said to be used for washing the hair. Saponin also occurs in the Chinese Tea-oil tree, *Camellia*

Sasanqua. This plant is cultivated in China for its seeds, which yield the so-called tea-oil. The seeds contain about ten per cent. of saponin, and the refuse after the oil is extracted is known as tea-seed cake, and this refuse is used by the Chinese for washing, and to poison fish. The saponin stupefies fish, which rise to the surface and are then easily captured. It is interesting to note that "a decoction of the refuse poured on a grass lawn causes the earthworms to come to the surface, and it is used consequently to eradicate earthworms from soil in which plants in pots are grown or to obtain speedily bait for angling."

Forest Conditions in the Southern Sierras.

NO more magnificent forests are to be found in the Sierra Nevada mountains than in the district lying to the west and south-west of Mount Whitney, and including the headwaters of the Kern, Tule and Kaweah rivers; yet, although it is a region of beautiful and varied scenery, easily reached and adjoining the highest peaks of the range, it is one but little known and seldom visited except by the people of the immediate vicinity in the valley below and some adventurous climbers of Mount Whitney. In fact, many intelligent Californians are still unaware even of the existence of the Sequoia National Park which is under military protection, and know nothing of the Sierra Forest Reserve, which extends from the Yosemite National Park southward over two hundred miles, with an average breadth of, perhaps, fifty miles to Mount Breckenridge, in Kern County, and which is not under protection of any kind at present, the lands within it still belonging to the Government, having merely been withdrawn from sale or entry. Only two wagon-roads penetrate this country, and these only for a short distance—one from Porterville up the Middle Fork of the Tule to some sawmills and the "summer shanty town" of Mountain Home, at an elevation of about 6,000 feet; the other from Visalia up the East Fork of the Kaweah through the Sequoia Park to Mineral King, a deserted mining camp, at an altitude of 7,700 feet, the usual headquarters of the company of United States cavalry which patrols the park during the summer.

On entering this region from the plains of the great valley a distance of about twenty-five miles is usually traversed through foothills and lower mountains before reaching the coniferous forests. The change in vegetation is apt to be abrupt from the White Oaks and Scrub Oak, the Manzanita and *Ceanothus*, to the immense shafts of the Yellow and Sugar Pines, the Incense Cedars, and a little farther on the red boles of the Sequoias. Here the undergrowth is now almost wanting, consisting, for the most part, of scattering clusters of young conifers, with the intervening spaces usually quite bare, except where in more protected or less shaded stretches the lowly, odorous Squaw-mat, *Chamaebatia foliolosa*, covers the pine-needles with its lawn-like green. Higher up the forest becomes denser, the White, and afterward the Red Firs, as *Abies concolor* and *A. magnifica* are locally termed, begin to predominate, and the wet meadows on the higher altitudes are often held in exclusive possession by the white stems of the Tamaracks (*Pinus Murrayana*).

Aside from the so-called Giant Forest in the park, near the Marble Fork of the Kaweah, there are scattered throughout this district many fine groves of Sequoia *Wellingtonia* upon the upper waters of the Tule and Kaweah, each extending over several hundred acres, and often for two or three miles, mingled with other trees, and each containing many hundreds of Redwoods, as the Sequoias are here called. Professor Dudley speaks of this region as "the real home of the species." In spots sheltered from fire and grazing, young trees are found in considerable numbers of a size from two to ten feet high, while trees of a size intermediate between these and the smaller giants, six or eight feet in diameter, are very rare.

Scattered throughout the district at altitudes between 5,000 and 8,000 feet is the Sugar Pine, first among its

neighbors in usefulness as well as beauty, and second only to the Sequoias in size. Too much can never be said of the varied and picturesque individuality of this beautiful tree, which Douglas, upon discovering it in 1826, declared to be "the most princely of the genus; perhaps, even the grandest specimen of vegetation known." Its most striking characteristic is in its slender, straggling branches thrown out irregularly from the upper trunk and terminated by a single, long, heavy cone pendent from the tip, shooting out like a skyrocket just ready to burst.

On account of the lack of transportation facilities, the amount of lumbering so far done in these mountains is small, and it seems that forest fires of any great extent have not ravaged the forests here for many years, though the blackened bark of the older trees testifies plainly as to the manner in which the former undergrowth was done away with. But, while fortunate in these respects, this has been the most thoroughly overrun with sheep of any section of the Sierra, over 200,000 head being driven annually to the headwaters of the Kern and Tule rivers. When the sheep were first brought in here, some thirty years ago, there was a dense undergrowth of young trees, grass and shrubs, while in the mountain meadows the feed was as high as a horse's back, say the old mountaineers. To-day upon the Upper Kern and Little Kern there are miles after miles of country left utterly bare; from the bole of one great conifer to another there is scarcely even a pine-needle to cover the coarse, gray, granite sand. To start a forest fire would be absolutely impossible; there is nothing left to burn. Like the Roman general who made the enemy's country a desert and called it "peace," the sheepmen now claim that the sheep benefit the forests by keeping down the undergrowth, thereby bringing security from forest fires. Others say that inasmuch as there will be nothing left to feed upon in a few years more, the sheep will work their own expulsion.

In the late spring, before the arrival of the sheep, many places can be seen where the young Pines are covering the ground like grass on a lawn, and where squirrels have "cached" their winter supply of seeds little tufts of dozens of tiny trees spring up. A few weeks later not a sign of a tree is to be found, and little holes show where the seed-beds of the squirrels have been dug up by the feet of the sheep to obtain the last remnants of the kernels.

On the first establishment of the park and its patrolling by the cavalry there was a feeling of bitter resentment against the new policy by all connected, even indirectly, with the sheep industry. Some herders, aware of the absence of a legal penalty for trespassing, thought well to ignore the presence of the soldiers, and allowed their sheep to graze within the park in spite of warning. They discovered their mistake when, after being escorted a couple of days' journey across the park, they were ejected with the admonition not to be caught again within it, their sheep, meantime, having been driven out at the nearest point on the boundary to roam at liberty over the mountains until their owners had made their way back around the borders and gathered together the remnant. At present, however, the protection of the forests is acquiesced in without comment, and the further extension of the protected area is looked upon by the sheep owners as a thing to be expected at any time, and already taken into account in their plans for the future. A year or two ago notices were posted forbidding the pasturing of sheep in the reserve, and, though most of them were at once torn down, there was some disposition to obey them by many of the American owners, but, as no effort was made by the Government to enforce the regulation, it soon became a dead letter. In fact, it is probable that the closing of the entire reserve would be looked upon favorably by a large part of the American sheep-men, partly under the expectation that the foreigners owning no land would thereby be forced out of the business, and partly, no doubt, in the case of those owning patented lands within the boundaries of the reserve, with the thought that the Government could not

in justice forbid them access to property it had already sold to them, nor without great expense in the way of fencing or police could it enforce a strict observance of the boundaries of the land sold. The large amount of this land disposed of by the Government before the formation of the reserve, and now within its limits, will be one of the most difficult problems to solve in any action hereafter to be taken for the protection of these forests.

A great part of the sheep pastured on the public lands belong to foreigners, chiefly French and Spanish, of Provençal or Basque origin, who, owning no land and paying no taxes, are most thoroughly despised by their American neighbors. They are, nevertheless, an industrious, frugal and hardy race, willing for the sake of a mere subsistence to face dangers and hardships which few Americans would care to endure for a like recompense. Accustomed from childhood and through generations of ancestors to lead their flocks every summer into the upper Alps and Pyrenees, they penetrate every nook and corner of the mountains where feed is to be found, a few days' pasturage being a sufficient inducement for them to take their charges over paths difficult and dangerous even for men, where the sure-footed donkeys with their supplies may, perhaps, have to be let down or pulled up by ropes, and where the sheep can only be driven by the most expert management and knowledge of their habits. The most adventurous mountain climbers of the Sierra Club, in their explorations of the fastnesses of the high Sierra, find few spots so remote or inaccessible as not to show traces of their having been already visited by these indefatigable peasants.

Aside from these few exceptions then, it may be said that the sentiment of the people of the district is now almost unanimous in favor of increased Government control. The inhabitants of the valleys below, who use these waters for irrigation, understand the necessity of preserving the forest-cover on the mountains, and as great numbers of them come up toward the sources of the stream each summer to escape the intense heat of the plains, they become acquainted with the conditions and the denudation at present prevailing. The ice has been broken. An example has been placed before them in the protected park, where the improved appearance of vegetation is apparent to the most inattentive traveler as soon as he passes the boundary. Public feeling seems to be ready for another step. The first should certainly be to enlarge the area from which trespassers are excluded, which could be done by the Executive without the necessity of legislative action. Captain Parker, acting superintendent of the park, says, in his report for 1894 :

I respectfully renew my recommendations of last year on the subject of extending the park so as to take in that portion of the forest reserve lying east of Sequoia and General Grant parks. This would include a most picturesque and grand portion of the Kings River Cañon, and also the Kern River country, a section rich in scenic grandeur and beauty, which is visited each year by great numbers of tourists. This extension would make possible the employment of troops, and thus rid the country of sheep, a result which seems impossible at present to hope for in any other way. It would take in the source of the South Fork of the Kings River, of the Kern River, and includes more of the sources of the Kaweah River than does the park as at present laid out. It would simplify the sheep question by interposing to the migrating sheep herds a barrier stretching entirely across the mountain country, thus restricting their operations. It would be hailed with delight by the tourists, fishermen and sportsmen, who now find this country barren, desolate and devoid of feed for their riding and pack animals. Such an extension has its precedent in the enlargement of the Yellowstone Park, April 14th, 1891, an order of the President including therein a portion of the forest reserve adjoining.

As to the further future with respect to some thorough system of forestry practice for this reason, it can be said that, thanks to the initiative of a few far-seeing men, with the aid of GARDEN AND FOREST and some other journals, the subject is no longer a mere theme for academic discussion, as it was until of late, but is receiving local attention and

intelligent observation from those most nearly concerned. The matter is one frequently and seriously discussed in all its bearings, and there is scarcely an intelligent mountaineer in the district who is not ready with some more or less pertinent and practical suggestions. Whenever the Government is prepared to put in operation a well-considered scheme for the proper management and utilization of the varied resources of these mountains, with due regard to their use as a pleasure resort, game preserves and timber-producing forests, it will undoubtedly receive the hearty support and coöperation of a large majority of the people most directly interested.

Santa Barbara, Calif.

Frank M. Gallaher.

Shall We have a Bureau of Plant Registration?

THE question of establishing a bureau for the registration of plants, in connection with the present Division of Pomology, was brought before the Section of Botany and Horticulture of the Association of American Agricultural Colleges and Experiment Stations, by Professor L. C. Corbett, of the West Virginia University. After a careful consideration of the matter, the Section appointed a committee to report upon the feasibility of the scheme, and to suggest the outline of a plan to be presented to Congress at an early date. The committee consists of L. C. Corbett, Morgantown, West Virginia, chairman; W. A. Taylor, United States Department of Agriculture, Washington, District of Columbia; Professor L. H. Bailey, Ithaca, New York; F. S. Earle, Auburn, Alabama, and C. H. Shinn, Berkeley, California.

The idea is to have some one place in the United States where all plants placed upon the market can be officially registered, numbered, and a description, together with specimens of the bloom, seed, foliage and fruit, placed on record. When it is not practicable to preserve the original, colored casts are to be prepared, as in the case of citrus, drupaceous and pomaceous fruit, as well as vegetables. In all cases where plants are sent for registration, specimens of flowers, foliage, fruit, root, tuber or seed must accompany the application. All vegetables must be accompanied by a given amount of seed (to be determined) to be preserved for purposes of noting the duration of cultural varieties, the influence of climate during any series of years, or in any locality. A further purpose of the seed shall be to grow plants for purposes of identifying the sort.

ENDS SOUGHT.—(1) To discourage the duplication of names, and the renaming of old sorts for commercial purposes. (2) To form a national herbarium of economic plants, which shall be made up largely from type specimens. (3) To simplify the matter of nomenclature. (4) To aid the student of varieties as well as of variation of plants under culture. (5) To secure to the originator of a truly valuable variety some reward for his labor, the same as is now accorded the inventor.

The incorporation of such a clause (No. 5) will, I am sure, secure the hearty coöperation of all plant-breeders, nurserymen and seedsmen, and this coöperation we must have in order to advance the scientific ends sought.

It is further proposed that this central bureau be made a part and parcel of the present Division of Pomology of the United States Department of Agriculture. A very valuable nucleus for the beginning of such work is had in the fruit models now in the museum of that department. Every one interested in this matter is invited to formulate his ideas on the subject and send them to some member of the committee, who will put them in such form that a bill may be drafted at an early date and presented before Congress. The reason for selecting a committee whose members are so widely scattered is to find out as fully as practicable the needs and wishes of different sections of the United States. The hearty coöperation of all persons interested in this subject is confidently expected.

Agricultural Experiment Station, Morgantown, W. Va.

L. C. Corbett.

New or Little-known Plants.

Dog-tooth Violets on Mount Ranier.

WE shall take occasion to speak again of the beauty of the alpine vegetation near the timber-line on Mount Ranier, in Washington, and we have already published a view of a mass of the beautiful alpine *Erigeron saluginosus* growing on the slopes of this mountain (see vol. ii., page 319). The great floral display of Ranier, however, is made by two species of Dog-tooth Violet, the yellow-flowered *Erythronium giganteum* and the white-flowered *Erythronium albidum*. These two plants grow in the greatest profusion among the grasses on the slopes of this mountain at an elevation of about 6,000 feet, attaining a size and luxuriance which we have not noticed in any other part of the country. In Paradise Valley, near the foot of the Nisgully Glacier, they cover broad stretches, and their abundance is so great that the white and yellow nodding flowers nearly hide the turf above which they are raised on slender stems. When the hot sun of July and early August has reduced the snowbanks to the depth of about an inch the plants push up through the snow, each one making for itself a little open circular space; in two or three days more, or when the last snow has gone, the plants are in full flower, and at the end of another week, so short is the season of vegetation at this high altitude and so rapid the development of plants, the flowers have gone and the fruit has attained nearly its full size.

Some slight idea of the abundance of these plants on Mount Ranier may be obtained from our illustration on page 505 of this issue, made from a photograph taken by Mr. Curtis, of Seattle. No picture, however, and no words of which we have command can give any idea of the delicacy, grace and beauty of these plants, which for a few long summer days display their loveliness on these wind-swept alpine slopes.

Aster longifolius, Lam.

UNTIL a few years ago this name was applied by American botanists to one of the commonest and most polymorphous species of the eastern seaboard. But in 1882, after a critical study of type specimens in the European herbaria, Dr. Gray showed* that the plant which had been passing as *Aster longifolius* was really the Linnæan *A. Novi-Belgii*, and, on the other hand, that Lamarck's *A. longifolius* was a northern species little known to American collectors; and although the species is defined in the *Synoptical Flora*, it is still almost as little known as before.

This obscurity is due, no doubt, to the fact that outside British America the plant occurs only along the northern borders of the United States, and possibly in the Rocky Mountains. Apparently not rare through Canada from the Gulf of St. Lawrence westward to the Saskatchewan and Great Slave Lake, the species extends southward to Halifax, the mouth of the Kennebec and the White Mountains in the east, and to Lake Superior and northern Minnesota farther west. Plants from Montana and Colorado have been referred here, but the specimens at hand (Scribner's No. 94 from Teton River, Montana, and L. F. Ward's No. 1 from Citadel Butte, Montana) seem to have little affinity with the eastern plant.†

Like the related species of *Aster*, *A. longifolius* presents a broad range of forms. As it occurs along the Maine coast it is often treacherously near *A. Novi-Belgii*. But farther inland, along the St. John and Aroostook Rivers, where as yet no forms of *A. Novi-Belgii* have been detected, the plant appears in its more typical form. Yet there one is puzzled by intermediates, for *A. longifolius* has a strong

* *Proc. Amer. Acad.*, xvii., 167, 169.

† Since the above was written I have seen a specimen which is clearly *Aster longifolius*, collected by Dr. Geo. G. Kennedy in the Blue Hills, West Quincy, Mass.

tendency to intergrade with both *A. paniculatus* and *A. junceus*.

As the species ordinarily appears it is very slender and from one to four feet in height. The stems are quite glabrous, or pass by gradual transitions to a densely white-villous form, the var. *villicaulis*, Gray. The leaves are thin and smooth, or rarely thickish and somewhat scabrous on the margins. They are from three to eight inches long, varying from lanceolate to linear-lanceolate, usually attenuate to the tip, and either tapering gradually to a narrow sessile base or with a slightly auriculate-clasping insertion. Generally the margins are nearly or quite entire, but occasionally they are sharply serrate.

The cymose-paniculate inflorescence is leafy, the branches being either short with one or two heads, or elongated and bearing several heads. The heads, as a rule, are rather

be distinguished by the fact that in *A. Novi-Belgii* the inner bracts are of unequal length and somewhat squarrose. Tall forms of *A. longifolius* without foliaceous bracts may sometimes be confused with *A. paniculatus*, but the heads of *A. longifolius* are usually larger, and in pure *A. paniculatus* the bracts of the involucre are shorter and imbricated. From *A. junceus*, too, the plant may best be distinguished by the fact that in *A. junceus* the involucre bracts are definitely of two or three lengths, as well as by the lower habit, and thicker usually narrower and strongly scabrous leaves of the latter species.

The specimen from which Mr. Faxon has made the drawing on page 507 was collected at Fort Fairfield, Maine, where, in the thickets and on the gravelly banks of the Aroostook River, the plant appears in great abundance.

Gray Herbarium, Cambridge, Mass.

Merritt L. Fernald.



Fig. 72.—Dog-tooth Violets on Mount Ranier.—See page 504.

smaller than in *Aster Novi-Belgii*, though in some few-flowered specimens they are fully one and a half inches across. The involucre is four or five lines high, composed of loosely one or two seriate approximately equal linear bracts with acute or long-acuminate herbaceous tips, and frequently there is an outer series of lanceolate foliaceous bracts. The rays are from three to seven lines long, varying in color from pure white through pink to deep blue.

As already suggested, this plant tends to intergrade with at least three species, *Aster Novi-Belgii*, *A. paniculatus* and *A. junceus*. From all these species *A. longifolius* may be distinguished by its involucre of loose and essentially equal bracts. Forms with the outer bracts foliaceous, however, strongly simulate *A. Novi-Belgii*. These may generally

Cultural Department.

Mexican Lælias.

LÆLIA ANCEPS and its varieties, *L. autumnalis*, *L. albida*, *L. Gouldiana*, and other forms that bloom during midwinter are particularly useful in this dull season. The flowers of *L. anceps* alone, if a number of them are grown, make an effective display, especially if a few of the superb white forms are used with the typical form. None of these flowers are of much value for cutting. The stems do not readily absorb water and they fade soon. The flowering plants are, however, useful for decorative purposes, and the flowers last in good condition as long as six weeks in a moderately cool house free from excessive moisture.

For various reasons these Mexican Orchids have a rather

poor reputation among cultivators, but there is no difficulty that may not easily be overcome with rational treatment. It is quite possible that all the *Laelias* named would thrive better out-of-doors for four months each year, beginning with June, if a light airy structure is not at hand for them. We have for several years had plants of the white form of *L. anceps* that have steadily refused to flower when grown in the greenhouse, but when placed in partial shade with *Cypripedium insigne* during the past summer they improved in strength to such an extent that some are now about to bloom, and all show a decided increase of vigor. They were placed in a position where the sun shone on them until about 11 o'clock, when large Elms afforded shade during the hottest portion of the day. We tried this plan because the new growths were not stiff enough to hold the leaves rigid, and they had a tendency to lay over to one side to their permanent disfigurement if left alone. Sometimes *Cattleyas* show these symptoms, especially those of the two-leaved section, such as *C. Leopoldii* and *C. Bowringiana*, and there is no surer sign of too much heat and not enough air; perhaps not during the day, for at that time of year the temperature is beyond control, but at night enough air is not allowed to circulate among the plants. As we could not provide a cooler structure with the proper amount of light, we put the plants outdoors. The leaves were tied up to maintain a normal position; they at once began to stiffen, and the results were all that could be desired.

It is well known that there are several types of white *Laelia anceps*. Some flower freely, as *L. Hilliana* and *L. stella*, but many need to be grown very strong to induce them to bloom, as *L. Sanderiana*. There is no doubt, however, that all will flower each year with proper care, which includes plenty of water. Mexican *Laelias* enjoy a spraying overhead once a day, and even more often on very hot days, provided the material in which they are grown is suitable and in a wholesome and porous condition. Nothing but good sound *Osmunda*-root should be used to grow them in, with no addition of moss, as this will decay and make the whole inert. A very little moss might be used as an index to the state of the material in winter, but not enough to blend it through the whole potting material, as is generally done.

It is sometimes advised to keep these plants dry so as to rest them after flowering, but this is a great error. They need recuperation, it is true, but nothing effects this so well as moisture. After blooming, the bulbs are shriveled from the strain upon them, and a fascicle of new roots is pushed from the base of the flowering bulb, which seeks more food in the way of new material and moisture to make good the loss. This is an infallible guide to the right time to repot any Orchid, and it should be rather anticipated than otherwise, for delay will injure the young tender tips of these new roots. As soon as the flowers are cut from Mexican *Laelias* the roots should, therefore, be examined, and if repotting is required this should be done at once. Only a little compost should be used, rather than too much, owing to the great quantity of water that may be necessary in hot weather.

Laelia autumnalis will now be going out of flower. Our plants have already been taken out of the old receptacles and placed in new ones, with fresh material. If they are to be grown suspended from the roof of the greenhouse it is best to use charcoal for drainage, as it is much lighter in weight and stores moisture well. *L. Arnoldiana*, *L. Gouldiana* and *L. anceps* will need attention soon, as they each go out of bloom.

Laelia alba is not usually a success grown in pots or baskets. The plants, whether newly imported or established pieces, will grow best if tied with copper wire to pieces of Fern-root sawed out flat to the desired size and about two inches thick. The pieces should be wired on the flat side and suspended at the ends of the house. This has proved a good way to grow many of the species that have been most intractable under other methods.

Cattleya citrina is also a Mexican plant and is short-lived in cultivation. Some inferior dried scraps came into our possession some time since and they were also wired to a block of fern fibre. We did not expect them to thrive, but some have flowered; all are growing stronger and most will bloom at the next flowering period. This *Cattleya* is unique in being the only species found in Mexico, in its yellow color and in its persistent habit of growing downward. These features, added to its delicious fragrance, make it one of the plants that cultivators are anxious to grow well. Growing it on a block is, perhaps, not so generally practiced as circumstances would seem to warrant.

Cattleya Walkeriana, though of Brazilian origin, may well be classed with the foregoing, owing to its habit of winter blooming, its dwarf, almost round, bulbs, and bad reputation

from a cultural standpoint. We had a dozen scraps once, newly imported and rather unpromising in appearance; these were pegged on a block of Fern-root and suspended near the glass. There is great improvement in the size of the bulbs made here over those grown in their home. The plants flower freely and are a pleasing sight now, when some have three and four flowers to a stem. Grown in this way it is a decidedly handsome plant.

South Lancaster, Mass.

E. O. Orpet.

Care of Frames in Winter.

NO gardening establishment is complete without a number of cold frames, and in the spring season there are seldom enough for the requirements of a garden. We use all our frames during the winter season, and by careful attention to ventilation, picking over the plants, covering securely on cold nights, removal of snow from the protecting shutters and other details, the returns are satisfactory even during the dead of winter. We find that sashes $6\frac{1}{2} \times 4$ feet are a convenient size, glazed with 9×13 double thick glass. We prefer Singapore fibre mats to straw ones. They are fully as warm, mouse-proof, not liable to rot if laid by damp, more durable, and they leave no litter on the sashes. With ordinary care they should last at least six years; some in use here for nearly five years are but little the worse for wear. Match-board shutters seven-eighths of an inch thick are placed over the mats; if iron handles are screwed on the ends of these shutters (as well as on the sashes), they are much easier to move about. A good coat of paint on the upper surface improves their appearance and is a preservative.

For such plants as Double Daisies, Polyanthus, Pansies and Wallflowers, which are not reliably hardy here, we do not use mats or shutters at all. As soon as the beds are frozen firm we fill below the sashes with perfectly dry leaves, which are removed on the first coming of spring weather. Parsley and Lettuce may also be protected in this way, although we prefer to uncover them with our other plants and give them all the light possible. Good parsley, however, may be had all winter long by merely covering the plants with a good coating of the leaves. We have just packed a layer of dry leaves about the side of our Lettuce and Violet frames, and these are covered with shingles or boards to throw off moisture. Violets in frames are looked over once a week and all decaying or diseased foliage removed and the surface scratched over where green slime appears. We depend entirely on frames for our supply of Violets, and are never without them during the most severe weather. Marie Louise is still the best of the double sorts and is a persistent winter bloomer. Lady H. Campbell, much paler in color, flowers poorly in frames and evidently needs more heat to develop its flowers. Farquhar is giving us excellent flowers and of larger size than any other sort we grow. Some growers complain of disease in this Violet, but the finest flowers we have seen this season are of this variety, and no spot was seen on the stock. Wellsiana still proves much the best of any single Violet we have growing; the stems are stiff, flowers large, dark purple in color, with a fine odor. The Czar still proves a most useful variety and blooms very freely all winter. Luxonne, while better than the much overrated California, lacks the stiff stem and deep color of Wellsiana. We have discarded California, though some growers think highly of it. As a rampant grower it exceeds any other sort we know, but its flowers lack substance and are little superior in color to our wild Violets. It seeds freely, and large numbers of young plants appeared in a perennial bed near our Violet frame all summer, proving almost as troublesome as Chickweed. Snow cannot lie on Violet frames more than a few days at a time without serious injury to the plants. All the sunlight possible must be given during the dark months, and it is useless to expect flowers in winter without it.

We have a supply of Lettuces from frames from November until outdoor stock is ready. We are now cutting plants sown at the end of August and planted in their present quarters a month ago. A batch sown a month later will give nice heads during January and February. For Lettuces we use about two feet of leaves, which are tramped firmly, and over these place a coating of manure and loam. After January a gentle hotbed of stable-manure and leaves, mixed, is prepared at intervals of a month to advance the plants more rapidly. Lettuces dislike coddling, and are ruined by a warm, close atmosphere. They will damp badly if long covered with snow, and a little ventilation should be left on in all weathers, so that any steam may escape. Tennis-ball still proves the best all-round variety. A sowing of seed is made on a greenhouse shelf in December,

Fig. 73.—*Aster longifolius*, Lam.—See page 504.

and the plants set out in a gentle hotbed during January. A sowing of Forcing Erfurt Cauliflower is also seasonable then. We grow these indoors in four-inch pots until rooted, when they are transferred to a frame.

We formerly stored our winter Celery in frames, but have proved that it keeps much better well protected where it is

grown, and we do not now lift any. This season has been extremely mild, and we have not found it necessary to store any Cauliflowers in frames. At the end of November this vegetable is heading up nicely outdoors. We leave Brussels Sprouts out until more severe weather, when a number are carefully planted in frames, after removing all surplus leaves

These need abundant ventilation on every favorable day, and the sashes should be thrown off entirely on mild days.

In some localities such perennials as *Helianthus multiflorus* plenus, *Anemone Japonica*, *Tritoma*, etc., should be lifted and stored in a frame, and a coating of leaves is sufficient protection for them. Here they are hardy, except in the more exposed locations, where we protect with partially decayed leaves. A frame is the best place to store *Chrysanthemum*-stools for next season's stock, and planted out in good compost they give an abundance of stout fleshy cuttings in spring. They are not injured if frozen stiff for a few days, provided they thaw out in the dark, a rule which applies to all frozen plants. Hard-wooded plants, like *Azaleas*, *Genistas*, *Diosmas* and *Chorozemas*, can be held in frames if protected, while *Deutzias*, *Hydrangeas*, *Hybrid Perpetual Roses*, and forcing shrubs in variety can be stored under some of the sashes. If any of the pots are liable to be broken by frost, it is well to pack dry leaves among them. Dutch flowering bulbs placed in frames can be more readily examined, and taken indoors when needed, than if bedded in manure and straw out-of-doors.

The uses of frames are many. They provide a suitable place for a large number of plants which cannot be kept in heated structures, and in the early spring they can be utilized for raising crops of Radish, Lettuce, Beets, Carrots, Beans, Cucumbers and other vegetables, to say nothing of flowers in variety. After they are covered with snow it often happens that little attention is given them until spring, and, of course, it is useless to expect any returns when they are so neglected. No watering should be done except on the mornings of clear, bright days, or injury from damp will follow. Ventilation on every favorable opportunity, all possible light, and attention to covering materials are important and necessary during winter for good returns.

Taunton, Mass.

W. N. Craig.

Sternbergia macrantha.

THIS interesting plant flowered with me for the first time in late November, or several weeks later than its normal season in European gardens. The species was collected by Mr. Whittall in 1893 and introduced to cultivation the next year. The original bulbs were some unknown specimens brought in by his collectors, and he was pleasantly surprised when they first flowered, unplanted in an odd corner. Like the *Colchicums*, this *Sternbergia* flowers in the fall and the leaves appear in late winter. The flowers are large and of a lighter yellow than those of the better-known *S. lutea*, and altogether, from its shorter scapes and absence of foliage at the time of bloom, it can scarcely be considered as desirable a general garden plant. It is, however, a novel and charming addition to the garden at a time when cheerful flowers are not too plentiful. Under what conditions it will best prosper I have not yet satisfied myself, after growing plants in different locations. It is probable, however, that warm, sunny places inclined to dryness in summer would suit this species, as they do *S. lutea*. The "Winter Daffodil" seems to be a capricious plant if not properly located, but a most reliable and indispensable one if properly placed, and grown in fair-sized clumps. Bulbs increase with fair rapidity.

Elizabeth, N. J.

J. N. Gerard.

Correspondence.

Early California Oranges.

To the Editor of GARDEN AND FOREST:

Sir,—The first shipment of California oranges this year was sent to Chicago October 19th. They were described as "Australian Seedlings" and were grown in the Cahuenga valley, near Los Angeles. It has since been ascertained that they were Mediterranean Sweets and, so far as they purported to be oranges of the crop of 1896-7, were a misrepresentation, as they were oranges of last season which had remained on the trees through the summer. The car was consigned, and it is said netted a loss.

The first shipment from the Redlands district, which is among the earliest of this season's crop, consisted of two car-loads forwarded to New York City November 17th. The first car-load last year went forward November 30th. These oranges were sold at \$2.75 a box, free on board, and thus netted the growers \$2.00 a box, a good price, although not high enough, in my opinion, to warrant sending green fruit to market. Since November 17th several car-loads of Navel oranges have been forwarded, and one firm alone is now sending one car-load every day. The press of California is unanimous in condemning these early shipments. Oranges which have hung

upon the trees through the summer are not fair representatives of California fruit. Much of their juice has evaporated through the skin, and the result is a flabby, tasteless product. The early shipments of this season's crop are of green fruit, and it is difficult to understand why anybody should want to eat a green orange, which is no more pleasing in taste than a green apple or a half-ripe peach. Certainly those who buy and eat these oranges must form a poor opinion of California oranges.

I have been riding among the Redlands Orange groves every day for the past three months. October 19th, when the first shipment went forward, an orange here and there among the trees of these groves was just beginning to show tinges of yellow, in little spots about as big as a twenty-five cent piece. To-day, in the locations where oranges ripen the earliest, much of the fruit is still perfectly green; some of it is half-yellow, and some a pale, sickly, lemon color. Here and there a tree ripens its fruit earlier than the others, and this early fruit is culled from the whole orchard. On some trees all shades, from deep green to a pale yellow, are seen. Two months from now this fancy fruit, if left on the trees, would have a bright reddish yellow color, burnished like bronze, and the sour, insipid, unwholesome juice which it now contains would be ripened into nectar. Not the least unfortunate thing about these early shipments is that they diminish, by their volume, the amount of fancy fruit which might be sent later to establish a reputation for the California product in the markets of the east.

Experience has shown that the portion of this early fruit which reaches the market between Thanksgiving and New Year's sells usually at satisfactory prices. After the first of January there is a lull in the demand for California oranges until the first of February or later. And those shipments which have reached the eastern markets just too late for the holiday trade have invariably netted losses. This shows that consumers buy these oranges for holiday decorations, and not because they consider them fit to eat, and the fact is that no California oranges are fit to eat before the first of February. So long as growers can command two dollars a box, net, for this early fruit they will doubtless continue to sell it, regardless of the ultimate effect upon the reputation of their product. This is a short-sighted policy, especially as the best of these Navels netted the growers last year \$1.75 a box as an average for the season. It seems, to outsiders, hardly worth while to impair the strength of the later demand for a gain of twenty-five cents a box on a few early car-loads. Furthermore, it is understood in California that the Mexican and Jamaica oranges now in the eastern markets are far superior to the unripe California fruit, and the latter must be sold, if at all, upon the reputation of the Navel orange, which reputation these particular specimens tend to injure. The newspapers of California are justified in discouraging these shipments and in giving the fullest possible publicity to the facts in the case.

Redlands, Calif.

William M. Tisdale.

Meetings of Societies.

Vermont Horticultural Meeting.

THE first important horticultural meeting ever held in this state met at Burlington on December 3d, when the Vermont State Horticultural Society was permanently organized, with a large membership. Mr. T. L. Kinney, the largest apple grower in Vermont, was made President, and Professor F. A. Waugh, of Burlington, was elected Secretary.

Mr. Charles A. Hinsdill, speaking on "The Farmer's Fruit Garden," said that few farmers in southern Vermont supply their own families with fruit. They even buy berries to can, which are frequently shipped up from the New York market. The few who have undertaken small-fruit culture have thus found the local markets exceptionally good. There are numbers of summer visitors from the city in the vicinity during the fruit season who consume quantities of berries which now come mostly from the city markets.

Mr. L. M. Macomber, in speaking on Plum-culture in Vermont, said that the hardiest varieties of the *Domestica* class may be depended on for a full crop of plums about once in three years, and a light crop one of the two intervening years. He recommends the improved native Plums, especially those belonging to the *Americana* group. Of these he has grown numerous seedlings in addition to standard varieties. The *Americana* Plums bear a full crop practically every year if proper cross-pollination is assured, and Mr. Macomber thinks that the best of them, such as De Soto and Wolf, are equal to Lombard in quality. Pottawattomie, of the Chickasaw group,

is superior in quality, and has only the fault of bursting its skin when ripe. The Chickasaws, in general, are hardy in Vermont, though not quite as hardy or prolific as the Americana group. Marianna is a pretty plum, but does not bear well. Some of the Japanese Plums are hardy enough for Vermont, but they have not been sufficiently tested.

Mr. W. A. Orton, of the Vermont Experiment Station, said that in making the Bordeaux mixture the copper sulphate can be much more rapidly dissolved by hanging it in a sack just touching the surface of the water. This is because the resulting solution is much heavier than the pure water, and sinks rapidly to the bottom. If the copper sulphate is placed in the bottom of the vessel, the lower part of the solution soon becomes saturated and no more copper sulphate is dissolved. The lime and the copper sulphate should be made up separately and each one diluted with one-half the total water required. Then the copper sulphate should always be poured into the lime solution and never the reverse; for, if an excess of the copper sulphate is present at any time during the mixing, the durability of the mixture is disastrously affected. Bordeaux mixture made in this way will stand much longer without settling than when some other order of procedure is followed.

Mr. F. H. Horsford, in discussing "The Nurseryman's Responsibility," said that the commercial grower should furnish good, strong healthy stock, true to name and in good condition; but his responsibility is then at an end. There have been many frauds perpetrated upon the farmers by the tree agents, but for the most part the circumstances make it impossible to fix the responsibility. The planter handles his trees carelessly, paying small attention to labels. The orchard is then neglected, trees are broken down by cattle or storms, and may come up from the roots, so that by the time the trees begin to bear it is quite impossible to discover what the varieties were originally supposed to be. Some of these risks fall upon the nurseryman, who, in self-protection, must ask a higher price for his goods.

Professor W. M. Munson presented "Some Problems of Experimental Horticulture," saying that practical horticulturists and experiment station workers should frankly understand among themselves what are the most promising lines of investigation. The common tendency to press the stations for immediate and practical results is wrong. As examples for legitimate investigation he instanced the influences of stock on scion, the conditions of pollination, hybrid characters, subjects on which it is desirable to make positive generalizations, but on which our observations are still too few and inaccurate to enable us to generalize at all. Then the whole field of plant-breeding teems with problems. There is a fine opening for experimental enterprise in the acclimatization of exotic fruits and the amelioration of native ones. De Candolle wrote in the *Origin of Cultivated Plants* that there were only two native plants in cultivation in America, one being the Artichoke. Since that time we have brought into common cultivation the Blackberries, Raspberries, Gooseberries, Strawberries, Plums, Persimmons, Grapes and dozens of others. Yet we have made only a beginning in this direction.

Recent Publications.

An Illustrated Flora of the Northern United States, Canada and the British Possessions, from Newfoundland to the Parallel of the Southern Boundary of Virginia, and from the Atlantic Ocean westward to the 102d Meridian. By Nathaniel Lord Britton, Ph. D., and Hon. Addison Brown. The descriptive text, chiefly prepared by Professor Britton, with the assistance of specialists in several groups; the figures also drawn under his supervision. In three volumes. Vol. I., Ophioglossaceæ to Aizoaceæ. New York: Charles Scribner's Sons. 1896.

In few regions of the world are the students of systematic botany better provided with books for the study of the plants around them than in our northern states. To the list of our many excellent manuals and Floras is now added a treatise differing so much in plan from any of its predecessors that its publication cannot fail to mark an epoch in our botanical history. It aims to present the latest views of classification and nomenclature as applied to our plants, together with complete illustration of every species described. The magnitude of the undertaking will be appreciated when it is considered that 4,000 species are

to be thus treated, the present volume including about one-third of this number.

The advantage of supplementing botanical descriptions with figures placed in juxtaposition is so obvious that its adoption was one of the earliest devices of phytography, being the method of Brunfels, Fuchs and other fathers of the science. Their figures, though to-day chiefly studied in relation to the history of wood-engraving, are no less interesting in connection with the development of botanical illustration. In modern times the use of the more elaborate plate separated from the text has in great measure superseded that of the woodcut, and complete illustration of a Flora by the latter method has been rarely attempted on an extensive scale. The most notable example of its employment is, perhaps, Bentham's *Handbook of the British Flora*, in which every description is accompanied by an admirable figure from the experienced hand of Fitch. This work has so greatly aided the popular study of plants in England that the desire for a work on the same plan for the older portion of our own country has been often expressed. This now, thanks to the munificence of Judge Brown and the energy of Dr. Britton and his coadjutors, is fulfilled.

The difficulties of such an undertaking are hardly realized by those without experience in this kind of work. The preparation of adequate figures on the small scale necessitated, though made easier by the use of modern photographic processes, is still one of the hardest tasks of botanical draughtsmanship. To be satisfactory, such figures must seize on the most essential characters of the subject, presenting them simply, clearly and properly differentiated from those of its congeners. The analyses should be most judiciously selected, for much must be omitted that would be desirable if space allowed. The author of the text also has many obstacles to contend against. The mere typographical exigencies that force him to resort to a Procrustean method of fitting his descriptions to the page, depriving him of the freedom to expand here or curtail there, must at times seriously interfere with the relative proportion desirable in the component parts of his work.

That these and many other difficulties have, in the main, been overcome with so much success in the work before us is cause for congratulation. The immense number of species dealt with precluded the possibility of the figures being all drawn by the same hand. As a result their value is unequal; this is evident at a glance. Actual use in the hands of students must decide upon their trustworthiness. In the mean time it is safe to commend many of the illustrations, especially those in the families of Grasses and Sedges, where the subjects lend themselves readily to compressed treatment. Less satisfactory, it seems to us, are the figures of the Conifers and Orchids, and the Oaks, in many cases, seem drawn from unrepresentative specimens.

In the text we have a presentation of the latest phases of classification and nomenclature. Whatever difference of opinion may be held respecting the latter, few botanists will fail to welcome the adoption of the Engler system of classification. It is a pleasure to see our plants marshaled under its guidance. In regard to the nomenclature adopted, no such concurrence of opinion can be expected at the present time, and even the advocates of the new school can hardly claim that the application of the principles they uphold has yet reached perfection. In that portion of the work dealing with our specialty, for instance, we note one or two slips in this regard. The name *Taxus minor* cannot surely supplant *Taxus Canadensis*, Marshall, and *Picea rubra* will hardly stand if the rule "once a synonym, always a synonym," is to be enforced. It may also be suspected that the figures of *P. rubra* and *P. Mariana* have been accidentally transposed. At any rate, to our thinking, they would be more characteristic if changed about.

In general appearance the volume is extremely attractive. In every detail of mechanical execution it shows a good taste and sound judgment that reflect great credit on all concerned in its production. As the text and illustra-

tions of the remaining two volumes are already completed, their publication may be expected within a time reasonably required for their progress through the press. Their appearance will be impatiently awaited.

Notes.

According to *The Gardeners' Chronicle*, Harrison's Yellow Rose has been blooming in November. This is said to be a rare occurrence in England, and a second flowering of these Roses is certainly a rare event here.

At the Thanksgiving dinner of the American Society at the Hotel Cecil, in London, a feature of the banquet was an enormous pumpkin, weighing 175 pounds, sent to London by Captain Kroman, of Schoharie County, New York.

In this warm winter weather many shrubs are cheated into showing their flowers as if it were spring. In this latitude the flowers of *Jasminum nudiflorum*, which appear very early in spring, are usually caught by the frosts and rarely have their long wands covered with bright yellow blossoms as they do farther south. The plant is hardy here, however, and grows vigorously in Morningside Park, and many of the bushes are now quite full of bloom. In sheltered places Japan Quinces are also flowering.

Professor McDougal gives some very good reasons in the current number of Appleton's *Popular Science Monthly* for the establishment of a botanical garden in the West Indies, so that tropical plants could be studied without going to Buitenzorg or some other garden on the other side of the world. A laboratory and garden in the West Indies could be reached from any important city in our country in four or five days, and it would be much more accessible for the European botanist even than are those established among the antipodes. Such a garden would be of direct benefit to a great number of working botanists in America and furnish investigators and graduate students of this country with unequalled facilities for biological research.

We hear occasional criticisms of the California Violet by commercial growers, but, after all, there is something about a single Violet that is most attractive. We lately received a box of these flowers from Mr. A. Herrington, gardener to H. McK. Twombly, Esq., and they certainly left nothing to be desired in fragrance, or form or color. The flowers are bold, they are poised on long strong stems, they keep well and are wonderfully rich in color and delightfully odorous. Mr. Herrington writes that he expects to have these Violets all winter. The plants from which the flowers were gathered were set out in June and received open-field culture. They were kept to single crowns, and were lifted into the benches in September. They have become perfect rosettes with abundant foliage, each plant nearly a foot in diameter. We can think of nothing more satisfactory in the shape of a Violet than these flowers.

A thoroughly useful Farmers' Bulletin of about twenty pages, just issued by the United States Department of Agriculture, is entitled *Washed Soils. How to Prevent and Reclaim Them*. Along the banks of the Ohio and in many portions of the south hundreds of fields have been washed and furrowed beyond the possibility of profitable cultivation. How the destruction of forests has caused these gullies, how to prevent them, and how by cultivation, reforestation and covering up the ground with grass this evil can be checked and cured is plainly set forth in these pages. The illustrations are not artistic, but they are helpful, and the methods of constructing hillside ditches and terraces, the best preparation for forests, with approved methods of planting and caring for them, are all plainly set forth. The statements in this little tract are so truthful, and the deductions so logical and convincing, that every landowner who is not already familiar with them ought to read and consider them.

The English papers are giving a good deal of attention to American apples since these have become such an important feature of the English fruit market. *The Gardeners' Magazine*, in describing the auction sales, which are held three times a week at Liverpool, says that a single auctioneer sometimes sells more than 15,000 barrels a day, and as there are half a dozen salesmen, who each takes a turn of forty minutes, it is plain that a great deal of fruit is disposed of in a day. Sometimes the sales are not completed until midnight. Buyers are obliged to take twenty barrels at least on every accepted bid, with the option of as many of a given brand as are desired.

They are sold by samples of two barrels from every lot of twenty, one of which is opened on the face end and the other turned out in baskets, so that any dishonesty in packing can be seen. Barrels which are called "slack"—those in which the fruit rattles when it is shaken—need not be taken by the buyer, as they bring from fifty cents to a dollar below the ruling prices. A correspondent of *The Gardeners' Chronicle* writes that American shippers excel in grading and packing their fruit. He says that out of thousands of barrels of one variety of apples every fruit looks as if it had been run into the same mold, and this careful sizing does as much to sell the fruit as the finish in color and clearness of skin, in which particulars our fruit is so much superior to that grown in the climate of England. That the sale of the British fruit could be secured by appealing to British patriotism has proved to be a delusion, and the Merchandise Marks Act, which compels all American apples to be labeled as such, has only helped to advertise them.

So light was the crop of Pecan nuts in Texas and Louisiana that no new ones are in market. Last year's product, held over in ice-houses, sells at fifteen cents a pound, retail. Hickory nuts are also scarce, the crop in New Jersey, Pennsylvania, Connecticut and New York having failed. Ohio has furnished the main supplies for our market; new nuts sell for fifteen cents, and those from last year for ten cents, a quart. Butternuts, too, are far from plentiful, a few barrels only having come from Greene County, of this state. These sell at eight cents a quart. There has been a fair crop of black walnuts, which bring the same price as butternuts. The first almonds from France reached this country about the middle of November, and the choice kind known as Princess Paper-shell sell for twenty-five cents a pound. A similar almond from California, of fine quality and somewhat larger, has been here since early in November, and brings five cents a pound less than the favorite French almond. The thicker-shelled Tarragona almond, from Spain, has more recently come, and sells for fifteen cents. The crop of English walnuts is very large, and the nuts are of excellent quality this year. The first Grenoble walnuts were in market just before Thanksgiving at fifteen cents a pound. The Brazil nuts, which begin to come in spring, are of comparatively poor quality this year, due, it is said, to injury from late rains while being transported in open canoes to the seaport. These sell for twelve cents a pound. The first new filberts came from Sicily and Naples, and from Barcelona, a fortnight ago, and bring fifteen cents a pound, while English filberts, or cob nuts, in their husks, sell for forty cents. The Chinese Lychee nuts, so-called, are thirty cents a pound. No new Paradise or Caryocar nuts have arrived this year, though some from other years are still seen in the retail shops.

An interesting bulletin prepared by Mr. L. F. Kinney, Horticulturist of the Rhode Island Experiment Station, treats of Spinach with a description of the most approved methods of culture at the present day, the best way to irrigate, the protection of plants against mildews and leaf-miners and various other interesting points. In the matter of classification, four types of true Spinach which have originated from the natural species, *Spinacea oleracea*, are considered. The first of these is the Norfolk or Bloomsdale variety, which makes a vase-formed, thick-leaved plant, with leaves supported by stalks instead of resting on the ground. This type, which appears under half a dozen different names, is not popular among the large growers in Rhode Island because it goes to seed early, and yet it is unsurpassed in quality when harvested at the right time. The Round-leaved Spinach is the second type, and it makes a compact round plant with dark green, slow-growing leaves formed close to the ground. The third type is the Thick-leaved Spinach, which has the ends of the leaves pointed. It grows to a large size very rapidly. The Prickly-seed Spinach has leaves with long, slender stalks and narrow blades, and is not planted in the north as much as it deserves. The so-called New Zealand Spinach is botanically *Tetragonia expansa*, which, when properly cooked, makes a good substitute for Spinach, and can be grown during the hot summer months when it is impracticable to grow the true Spinach. The Mountain Spinach, or Garden Orache, is botanically *Atriplex Hortensis*, and none of its forms have much to recommend it. Spinach has been cultivated for a thousand years, but it was not grown in European gardens until the fifteenth or sixteenth century, and the greatest progress in its cultivation has been made within the last fifty years. The bulletin is numbered 41, and contains much interesting historical and cultural matter.

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Trees in Public Parks.

THE determination of the selectmen of the town of Winchester, Massachusetts, to remove a row of large Elm-trees which encroach on the principal street of the town, has met with such a storm of opposition among the inhabitants, and has been so generally condemned by the press of the state, that this particular row of trees will probably continue to shade the Winchester highway. This vigorous protest against cutting down these trees, which we have reason to believe is entirely justified by the peculiar circumstances of the case, represents the usual attitude of Americans toward the trees on their public grounds. They object on general principles and on all occasions to cutting down a tree, without stopping to consider whether it should be cut or not, and therefore often insist that trees should be left standing when really they ought to be removed. Park commissioners and other officers charged with the care of public grounds frequently try to defend themselves against charges of neglect of duty in such matters by entrenching themselves behind the public sentiment against the cutting of trees, which they claim is often so strong that they are helpless to act. Every expert, for example, who visits Central Park, in this city, sees that the excessive crowding of the trees is rapidly destroying their beauty and threatening their lives, and that hundreds of trees should be cut out at once in order to maintain the park in good condition. This has been explained year after year, and from time to time the park authorities have removed occasional trees here and there, but such work should go on steadily and constantly, and in a great pleasure garden like Central Park the axe should never be allowed to rest. The feeling against cutting a tree is, however, so strong in this community that it is exceedingly difficult for commissioners to accomplish any systematic work in this direction. If, however, the importance of this matter was once clearly understood, the public would not only uphold but demand these operations, and it is, therefore, one of the plain duties of Park Boards and their subordinates to instruct the people on this subject by object-lessons and in every other possible way.

We allude to Central Park because it is visited yearly by many people who see for themselves the need of prompt action with the axe in order to develop its greatest possibilities and beauty, and because we have been somewhat familiar with the workings of its management, but the same thing can be said with nearly equal truth of the condition of the plantations in all American parks. In Prospect Park, Brooklyn, the thinning of the border plantations has been so long delayed that their usefulness has gone, and they must be renewed at a very large cost and the loss of twenty-five or thirty years. In the Buffalo park the trees, about twenty-five years old, are everywhere crowding themselves out of shape, and, unless steps are taken to relieve them at once, the beauty of these plantations will be ruined forever. This condition of things exists also in the parks of Chicago and St. Louis, and in Druid Hill Park, Baltimore, and Fairmount Park, Philadelphia, where many old trees have been allowed to die prematurely through the neglect to apply simple remedies of preservation. Boston, however, enjoys the reputation of having the worst trees in its parks of any American city. The city has spent millions in securing park lands and in building elaborately constructed park roads and expensive park buildings, but little or nothing has been done for the trees which were growing on these lands; these are overcrowded, unshapely, full of dead and dying branches, and are harborers of dangerous insects, which spread from the parks into adjacent lands.

This general neglect of the trees in public parks in American cities cannot be explained by the excessive love felt for trees by the public, as park officers often assert. The cause must rather be looked for in the general indifference of Americans to their trees, and in the unfortunate fact that the tendency of American park makers in recent times is more to the perfection of park drives and walks and to the erection of expensive buildings, retaining-walls, bridges and other masonry structures, than to the care and maintenance of plantations. It is easier to lay down the lines of a gracefully curved driveway and to get it satisfactorily built than it is to make and maintain a good plantation of trees; and the thorough knowledge of trees which is essential for good park-planting, comes only from long study and special powers of observation. But, on the other hand, park makers and park commissioners must remember that a road, a bridge or a building can be completed in a single season, and that only a few months are required to change the roughest piece of ground into a smiling lawn, while it takes the best part of a century to bring a tree to perfection, and that this perfection can never be obtained if it is allowed to remain neglected during any considerable period. Roads and walks and buildings of all sorts are needed in parks to make them available for public use, but they are necessary evils to be subordinated as far as possible to the natural features which give them their real value. The most important of these natural features are the trees, and parks are beautiful and useful as they are furnished with good trees; it is certainly to be deplored that the modern tendency in park management is to do everything else in a park but care for the trees, which, as we have already said, are not only the most essential features of a park, but the most difficult to obtain. Experts in the care of ornamental trees are sadly needed in the United States, and if they can be found the managers of our parks singularly neglect their duties if they fail to avail themselves of the technical knowledge of such men.

The New York Traffic in Christmas Greens.

THOUSANDS of closely tied Christmas trees piled up in the wide street space before the dock and ferry entrances along West Street have indicated for a fortnight past that the holiday season is at hand. One who would visit the principal seat of another branch of Christmas industry must leave the West Street car at the picturesque fronts of the Gansevoort markets, and, passing the whole

sale meat and live-fowl section to the river, he will find the Magenta, a steamer which sails each afternoon for Keyport, New Jersey. The voyage costs but fifty cents for the sail out and return, and offers the beholder one of the world's most magnificent spectacles of sea and shore. Leaving the palisades, the shipping along shore, the city, the harbor islands, the forts at the Narrows and the quarantine stations, the purple haze over the brown hills and red fields of Staten Island and New Jersey comes into view. Outgoing ocean steamers pass to the east, the sails of anchored fishing boats catch and reflect the afternoon sunlight, while others are dull gray in the early twilight. The stretch of water crossed in the southward course is smooth or rough, as is the open sea to eastward. Entering Raritan Bay the steamer advances between forests of slender stakes which mark out oyster beds. At the head of the bay is Keyport, from which place the first Christmas greens were shipped to New York more than a half century ago, and this section is still the chief seat of the trade. A representative of the third generation of one of the two or three families who started the industry is now in the business, his energetic ancestor a man-of-war's man of 1812, and, later in life, keeper of the shore Waack-waack lighthouse at Keanesburg. The first consignments were tied up in sheets and carried to market with farm produce on old-style sailboats with lee boards on the outside. Strong head winds made a wait of perhaps a couple of days necessary in the Kills off Staten Island, and the voyage not infrequently took a week. The early trade was altogether in loose branches of White Pine, Holly, Laurel and Hemlock, and in plants of the Club Mosses, and the gatherings were piled up during late autumn in successive loads until the houses were nearly hidden behind stacks of boughs. Churches were large buyers, the members of the congregations making the designs. Bouquets of berried Black Alder and Ground Pine were the first arrangements, and gradually the trade in made pieces grew. Paper flowers were the first bits of bright color introduced, and fifteen years ago immortelles were adopted. The latter are still in general use, besides dyed Cape flowers and Balsam, or Everlasting (*Gnaphalium*), and sometimes the colored plumes of the grass locally known as Quill weed, some Bitter Sweet and Holly berries.

For a mile back from the shore of the bay, the entire length of Monmouth County, nearly every household is now engaged in the making of Christmas greens, which include stars, wreaths, hearts, anchors, crosses, triangles and horseshoes, besides great quantities of roping. Keanesburg, four miles from Keyport, is the busiest section, where neighbors are alluded to as "making" or "not making," according to whether the family is manufacturing greens at home or some members are engaged in the work in near-by houses. The door-yard sweepings of waste bits of the greens and bright immortelles mark these busy houses. Detached summer kitchens are usually the workshops. Continuous tables are built along the sides or extend through the middle, and before piles of Princess pine, box, laurel, moss, holly, hemlock, immortelles, Cape flowers and native balsam, young girls work. The social instinct contributes no little to the trade, for the workers come from comfortable homes, many of them established by early-settler ancestors, and their education and conduct are unmistakably good. The makers realize, perhaps, the most satisfaction out of the busy season of eight or nine weeks which follow election day, in being able to give Christmas gifts more freely, in procuring luxuries for themselves and in the general festivity of the entire working season. Gay chat and open confidences characterize the daytime, and in the evenings groups of wholesome young men, who are boat-builders or who "follow the bay" as oystermen or fishermen, visit one or more of the work-rooms, and a couple of evenings during the busy term are snatched for a neighborhood dance. The evening visitors render little services in sharpening a dulled knife, cutting the roots off of bunches of "balsam," filling up the

tables with stock, with a care not to give poor material from the bottom of a sack to a favorite, unrolling and cutting cord into suitable lengths which is tied about a waist in a loose coil, and sometimes one of these hearty, bronzed young fellows will even "make" and add the finished pieces to the day's work of a pretty neighbor.

Since the great increase of the trade during the past ten or twelve years, and the consequent competition in prices, wages have been much reduced, and enough workers cannot always be secured from among the thrifty fisher folk and farmers near by. Through the extermination of needed materials in northern New Jersey, and consequent excursions southward to Barnegat and Toms River, some workers have come from those sections, and thus the business is spreading to remote points. The workers from other places are boarded, have their laundry work done and receive set weekly wages. Near-by workers are paid by the piece, and while the rates do not sound alluring to the city wage-earner, they are, nevertheless, all that the manufacturer can afford to pay. For making wreaths and other small and plain pieces eight cents a dozen is paid, and for stars, anchors, etc., twenty cents a dozen; four dozen of the more elaborate pieces is a steady and long day's work, from 7 or 8 o'clock in the morning until late in the evening. For making the ordinary grade of flat roping thirty cents is paid for a hundred yards. Two hundred yards a day requires accustomed fingers, though 400 yards is not an unusual achievement, and a lad last week accomplished 800 yards in a day of thirteen working hours. Sixteen years ago \$2.00 a dozen was paid for making stars of holly, and even more for special orders, while \$1.50 to \$2.25 a hundred yards was earned by making the flat roping, and \$4.00 for heavy round roping. The business has seen even greater changes, however; formerly Ground Pine, Princess Pine and Laurel were abundant hereabout, and the best Holly might be, not too openly, gathered by day on the Government lands at Sandy Hook and carried away in sloops after sunset, costing only the labor. Even Mistletoe was comparatively plentiful on old Sour Gum trees in the swamps near Freehold. Now almost nothing is collected from home fields except the so-called Balsam, and long trips must be made for the nearest laurel and holly. Commission houses in New York sell loose stock to these Monmouth County manufacturers, which has been shipped from the New England and southern states, and one of the largest and longest-established manufacturers, Mr. Robert Seeley, of Keanesburg, makes personal trips during October of each year into a half-dozen states to secure all the stock he needs. Of Princess Pine alone forty tons was used about Keanesburg this season, and this costs \$60.00 a ton in New Hampshire and Vermont. With \$12.00 added for freight, besides cartages, shrinkage and waste, the cost is nearly \$80.00 a ton for this raw material. As much as ten cents a pound has been paid for Princess Pine to fill orders after regular supplies were used. Holly is each year becoming more scarce, and further invasions are made into southern New Jersey, for, while many crates and barrels of holly from Delaware, Maryland and Virginia are sent to the New York wholesale dealers, this is necessarily cut in short lengths. The branches and tree-tops from New Jersey intended for decoration are larger and are not crated. A two-horse wagon-load of well-berried holly could be bought in New Jersey three years ago for \$25.00. Last year \$75.00 was paid for the same quantity, and gray moss, of which none is left in the northern part of the state, costs double the price of a few years ago. The best laurel roping, round and heavy, now sells for ten cents a yard on special order, whereas years ago there were standing orders from season to season at thirty cents a yard, with the rope and twine furnished in addition. For the cheaper roping no hemp rope is used, the overlapping stems making the foundation. Cultivated *Arbor-vitæ* is bought from nurseries, and native plants are shipped down the Hudson. A nursery stock of 100,000 Juniper-trees was secured by a dealer and used gradually in a few

seasons. Box is industriously sought out, and the trimmings well paid for, while occasionally whole door-yards full of box edgings with the plants of Tree Box on old estates are bought outright and cut off above the roots.

The cost for freightage is considerable. For a dozen wreaths two cents freight is charged on the steamer, and for stars four cents, while the light roping costs fifty cents for 1,000 yards, and heavier roping \$1.00 for the same quantity. A dealer whose season's output amounts to 92,000 yards of roping and above 40,000 pieces, and who this year used ten tons of Princess pine, besides other materials in proportion, last year paid \$400 for freight of raw goods and manufactured articles. As many as 12,000 to 15,000 yards of roping and 150 dozen pieces are sometimes hauled to the boat by a single dealer for one day's shipment to this city.

Some of the materials come from as far west as Chicago, and not a few of the made pieces go to Boston, and even into New Hampshire, where Holly is especially salable. Hemlock is no longer in general favor on account of its poor keeping quality. Much of the Princess pine this year comes from sections in New Hampshire and Vermont not previously picked over, and as there were no heavy early snows the collecting was easy and the color excellent. Laurel, too, is good, and without disfiguring spots, but the leaves of Holly are not as perfect as in recent years, nor are the berries as plentiful.

No little capital is invested in the trade, and the preparation begins in September, when the balsam is gathered before it is too ripe and touched by frosts. During autumn this is dyed, as are large quantities of Cape flowers, and dried out-of-doors. Sometimes the natural colored immortelles are dyed at home, but they are usually bought in bright hues from the importers. Quantities of laths are sawed in suitable widths in the mills and made up into stars and other designs at home, and "whips" are gathered in the woods for wreath-frames. Rattan is also largely used for horseshoes, hearts and anchors. Little bunches of the dyed flowers, fastened to toothpicks with wire, have to be prepared in advance. On the arrival of the first stock in November it is taken out of the sacks, shaken out in sheds or storehouses, wet and assorted, the brown and dull-colored Lycopodium being put aside for cheap roping. This is dipped into scalding green dye the day before shipment after it is made up. German buyers prefer the artificial green roping, and two city dealers who have this class of customers sell 10,000 yards of this grade. There is good and poor work in this business as in others, and manufacturers with established reputations have earned them by exacting careful work from the makers in the removal of tiny spikes or cones from the Lycopodiums and in well-overlapped twigs, so that no stems show and there are no scant spots. The roping is measured off and tied in twenty-five-yard lengths and the pieces in packages of a dozen. Pieces made of holly, a specialty in Keyport, must be stored during the few weeks before sales begin in cool and dark rooms and wet every day. The other greens are freshened with water just before shipment. A plentiful sprinkling of Princess pine pieces and roping with scalding water, which is allowed to freeze and then thaw out on the boat, freshens the stock up wonderfully. Until a fortnight before Christmas the shipments are comparatively light and only of special orders, mainly for public places, as florists' shops, markets and saloons. One of the department stores used 12,000 yards of roping in its decorations put up three weeks ago. Since Monday a week ago the Magenta has been closely packed with the greens, even in the passengers' saloon. The prices this year are not high; small wreaths of the more plentiful greens cost thirty to fifty cents to the wholesale buyer on the boat, and stars \$1.00 a dozen, while roping ranges from \$1.50 to \$10.00 a hundred yards. Holly is more costly. Set pieces made of cedar, moss, etc., for novel effect, do not find popular favor, and are usually closed out at a loss.

M. B. C.

New York.

The Value of Bud Varieties.

EVERY bud on a tree may produce a new variety of fruit just the same as every seed does. There is no difference between a bud variety and a seedling, except in degree. A variety in horticulture is simply a variation from the type which produces it and which is sufficiently marked to allow of description. The determination of the value of the variation depends entirely on the judgment of the operator who names it. Varieties are not special creations but normal variations in a plant which can be propagated with profit. To one mind the variation must be very apparent to justify the formation of a new variety; to another a slight difference may seem of equal value, and thus it is that many varieties differ only in minor points. If the various parts of a tree are studied, one is impressed with the unlikeness of its branches, its foliage, perhaps its fruit, which may differ in color, shape, size or time of ripening. In fact, no two apples on a tree are exactly alike, but a slight difference will appear in each on close examination. The tree is composed of a collection of individuals or buds, no two of which are surrounded by the same environment.

These slight differences have never been used as a starting-point in the improvement of existing horticultural varieties. In fact, a variety of fruit, after it once appears, is accepted and propagated without thought of systematically improving it. Animals are improved by careful selection of parents through each generation and a corresponding regard for the improvement of their environment, so that any gain in good qualities may be maintained and new ones started, but the improvement in orchard fruits is looked for through the introduction of entirely new forms.

It seems strange that the slight differences which appear in the buds, and are manifested in the variations in the fruit, should not have been more generally used as the foundation for the systematic improvement of orchard varieties. The fundamental principle of the Van Mons system of originating varieties rested on the selection of favorable differences in the seedlings through each generation, and it is the one broad principle underlying the operations of all plant breeders in building up new types. The ordinary method of continuing varieties by the promiscuous selection of scions and buds is not accompanied by a gradual betterment of the variety, but results in orchards with trees that always bear, in trees that never bear, and trees that sometimes bear. Improvement in horticulture should rest on the same general laws which have operated in the gradual evolution of the organic world, and that has ever been by the slow but progressive improvement of existing types.

Those marked variations in buds, however, which are particularly noticeable, are eagerly grasped after by florists, and they have been the source of several prominent orchard varieties. These variations are called sports, and a sport is a bud whose difference from other buds is greater than the ordinary differences which constantly occur. Among the fruits which have originated as sports are the Isabella Regia Grape of California, a sport of the Isabella, which has larger branches and is propagated in that state as a table grape with more profit than the other American or Vinifera types; the Hero and Storm King are sports of the Concord, though neither has been valuable; Cannon's Early Peach is a sport from the Mountain Rose, which is ten days earlier, larger, more highly colored, and is now quite extensively propagated in Delaware; Bank's Gravenstein of Canada is a sport of the Gravenstein Apple, and promises to replace its parent in many sections; the Peento Peach of Florida often bears fruit with the common flat form of its parent and an oblong point; the Golden Queen Raspberry is a sport of the Cuthbert, having originated in Berlin, New Jersey.

The list of bud varieties could be further extended and several hundred varieties of flowers named. I simply mean to point out that bud varieties often originate through

violent variation in buds, and that these sports are often of value. But to depend on sports for new varieties is as much of a lottery as to wait for a good seedling to turn up. Only one in a thousand is ever of value as a variety. Is it not reasonable to believe that if horticulturists were to take the slight variations presented in the trees of our best varieties as the starting-point for the improvement of existing varieties and propagate them by judicious selection in each succeeding generation, that a marked improvement would result in all of our best types of fruit?

Experiment Station, Newark, Del.

G. Harold Powell.

Foreign Correspondence.

London Letter.

EULOPHIELLA PEETERSIANA.—Under this name some imported Orchids were offered for sale at Messrs. Protheroe & Morris's auction-rooms lately. They are described by the venders, Messrs. F. Sander & Co., as "a glorious novelty sent home (presumably from Madagascar) by Mr. Mocris. It is like the recently introduced *Eulophiella Elisabethæ*. The flowers are large, produced on strong spikes, their color a deep rose. It is a plant of vigorous growth, producing its spikes freely from the axils of the lower leaves." The plants offered were long, stout-branched rhizomes, like those of *Iris Pseudacorus*, the thickest being two inches in diameter, yellowish white, marked with leaf-scars an inch apart, the upper portion clothed with the sheathing bases of dead leaves four inches in diameter. The flower-scapes are evidently very stout, the remains of them being fully half an inch in diameter, and they are produced from the leaf axils at about four inches from the apex of the rhizomes. I know nothing of the leaves or flowers, but, whatever the plant may be, it is certainly a most remarkable Orchid, and, if a *Eulophiella*, it should prove an interesting addition to the Orchids already introduced from Madagascar.

ODONTOGLOSSUM HALLI × CRISPUM.—There are numerous so-called natural hybrids among cultivated *Odontoglossums*, but hitherto the genus has not been operated upon with much success by the hybridizer. The first hybrid raised artificially was *O. Leroyanum*, the result of a cross between *O. crispum* and *O. luteopurpureum*, made by Monsieur Leroy, gardener to Baron E. de Rothschild, Gretz, and flowered in 1890. A second hybrid has now to be recorded, its parents being *O. Halli-leucoglossum* and *O. crispum Cooksoni*. It has been raised by Mr. Norman C. Cookson, of Wylam-on-Tyne, who showed it last week and obtained for it a first-class certificate. It combines the characters of the two parents both in color and form of flowers, being cream-white with red-brown blotches, the lip white with a yellow crest and a large red-brown blotch in front. It was by far the most interesting hybrid of the many that were shown at the last meeting of the Royal Horticultural Society. It is significant of the importance of hybrid Orchids nowadays that the bulk of new Orchids, and almost all the best, are those that have been raised by the hybridizer.

CYMBIDIUM CYPERIFOLIUM.—A plant of this rare Himalayan species at an auction sale this week commanded six guineas. It was in an eight-inch pot, and bore an elegant cluster of grassy leaves, with one scape of eight flowers, which are about as large as those of *C. elegans*, but colored greenish yellow, with brown parallel lines and a whitish lip with a few red spots.

CATTLEYA MANTINI.—This is a hybrid of garden origin, which flowered two years ago in the collection of Monsieur G. Mantin, Olivet, France. It is the result of crossing *Cattleya Bowringiana* with *C. Dowiana aurea*. Five plants of it have just been sold by auction and realized from eleven to fourteen guineas each. The pseudo-bulbs are about fifteen inches long, thicker than in *C. Bowringiana*, and each bears a pair of stout leaves nine inches by three. The flowers are borne several together on short

racemes, and are larger than those of *C. Bowringiana*, of a deep amethyst color, the lip veined with gold.

CYPRIPEDIUM BARON SCHREDER.—A hybrid between *Cypripedium Fairreanum* and *C. Enanthum superbum*. It was shown by its raisers, Messrs. J. Veitch & Sons, and received a first-class certificate, being, perhaps, the prettiest of all the hybrids of *Fairreanum* parentage. In form it is very elegant, the upper or dorsal sepal is white, shaded at the base with green, and lined and dotted with purplish red. The petals have the downward curve peculiar to the *Fairreanum* race, and are pale yellow, lined and spotted with purple-brown; the pouch is small, red brown, shaded with green and yellow.

LELIO-CATTLEYA DECIA ALBA.—Messrs. J. Veitch & Sons raised a hybrid called *Lælio-Cattleya Decia* in 1894 from L. Perrini and *C. Dowiana aurea*. They exhibited last week, and obtained a first-class certificate for a white variety of it named as above, and which is a most beautiful Orchid, the flowers being large, intermediate in form between the two parents, and of the purest white in the sepals and petals, the lip rosy mauve, with reticulating whitish lines. Hybrids such as this are really most valuable productions.

DRACÆNA BROOMFIELDII.—A new and handsome foliage plant was lately shown under this name by Messrs. F. Sander & Co. at a meeting of the Royal Horticultural Society, and received a first-class certificate. It is evidently allied to *Dracæna arborea*, a native of tropical Africa, although it is said to have been introduced from the "South Sea Islands" by Mr. J. Broomfield, after whom it is named. The plant shown was about a yard high and two feet through, the leaves gracefully arched, one and a half feet long and two inches wide, gradually tapering both ways and colored rich glossy green, with broad margins of ivory-white and thinner stripes of the same color scattered through the green. The stem is stout and short-jointed, and the leaves are very closely arranged upon it, forming a rather dense head. Apparently the plant retains its color, the oldest leaves being almost as brightly variegated as the youngest. It requires stove treatment. The exhibitors have now a trio of most distinct *Dracænas* in this plant, *D. Godseffiana* and *D. Sanderiana*.

LOWIA.—This is a genus of *Scitamineæ*, with lanceolate acuminate green leaves not unlike those of an *Aspidistra*. The flowers are borne in clusters about the bases of the leaf-stalks, and in form and color they are not unlike the flowers of some *Maxillarias*. There are two species, *Lowia longiflora* and *L. maxillarioides*, and they are both natives of Malaya. Both have been recently introduced into cultivation, *L. maxillarioides* to Kew, where it grows and flowers freely in a stove. A figure of it was published in *The Botanical Magazine* in 1894, t. 7351. It has leaves nine inches long and flowers two inches across, the sepals purple and the lip green. *L. longiflora* has been introduced by Mr. Bull and has lately been figured in *The Gardeners' Chronicle*. It has larger leaves than the other species, and the flowers are composed of three strap-shaped olive-colored sepals three inches long, the two upper petals linear and fimbriated at the tip, with the lower one lanceolate, two inches long and pure white. The genus is not likely to be popular with gardeners, but it is interesting and likely to gratify cultivators of curious plants.

PTERISANTHES POLITA.—Plants of this remarkable Malayan vine are now in flower at Kew. The genus is closely related to *Ampelopsis* and *Vitis*, having twining stems, cordate green herbaceous leaves and tendrill-like flower-stalks. Its most remarkable character is in the forms of its inflorescence, which is a pendulous flat fleshy receptacle, irregular in outline, about six inches long and an inch in width and colored purple. The flowers embedded on both sides of the receptacle are mostly sessile and hermaphrodite, while on its margins are stalked unisexual or sessile flowers. The fruits are flask-shaped berries containing several seeds. Specimens grown at Kew were recently exhibited before the Linnæan Society, where they were a source of much interest to the botanists.

PRIMULA OBCONICA × *SINENSIS*.—Mr. E. Hyde, of Ealing, exhibited recently plants which are said to be the result of crossing these two species. Although many attempts have been made to get *Primula Sinensis* to cross with other species of *Primula*, hitherto no one has proved successful.

segments colored rose-carmine. The hybrid showed little trace of *P. Sinensis*, although it differed from *P. obconica* in the form and color of its flowers. This species, however, shows considerable variation already under cultivation, and I have before seen so-called hybrids between it and



Fig. 74.—*Valeriana Sitchensis*.—See page 516.

And the same is true with regard to *P. obconica*. Mr. Hyde used the original or type of *P. Sinensis*, which was introduced from China a few years ago. It differs from the ordinary garden forms in having small, deeply cut, long-stalked leaves and small smooth flowers with reflexed

P. Sinensis which were nothing more than seedling sports of the former. Primulas, as a rule, do not cross freely. I have tried several times to cross *P. Japonica*, *P. imperialis*, *P. obconica* and *P. Forbesii*, but have had no success.

London.

W. Watson.

New or Little-known Plants.

Valeriana Sitchensis.

AT elevations of five or six thousand feet above the sea on the slopes of Mount Ranier, the great Washington mountain, at the point where the forest has been forced on to narrow rocky ridges in its struggle to maintain itself against the cold of the enormous ice-capped peak, alpine flowers grow in a profusion, variety and luxuriousness which is hardly known elsewhere in the United States. The beauty and abundance of these flowers has given its name to Paradise Valley, one of the best known of these high slopes, as it is the principal camping-place for travelers who wish to try the ascent of the mountain or enjoy the magnificent views which can be obtained from this spot.

Among the Columbines and Gentians, the Dog-tooth Violets and Dodecatheons, the delightful white-flowered alpine Rhododendrons, the dwarf Mountain Ash and the alpine Sedges and Grasses, the Sitka Valerian is conspicuous with its clusters of pale flesh-colored flowers, which possess such a powerful and delightful fragrance that it passes as a Heliotrope among the campers on the mountain.

Mr. Curtis, of Seattle, took a number of photographs last summer in this valley, among them a bunch of this Valerian, which is reproduced on page 515 of this issue. We are unaware if any attempt has been made to grow this plant in gardens, or whether this inhabitant of high northern countries and mountain slopes could be induced to bear the conditions of a lowland garden. The attempt to cultivate it, however, is certainly worth making, as it is one of the most delightful flowers of the far northwest.

Cultural Department.

Selaginellas.

A FEW of the more common sorts of this extensive genus are generally found in most greenhouses, but a considerable collection of them is rarely seen in private gardens. Even in the commercial places they are not so generally grown as their decorative qualities and comparatively easy culture seem to warrant.

The most extensively and most easily grown species is the moss-like *Selaginella Kraussiana*, which is so well known that description is needless. Apart from being grown as individual plants in pots or pans, there appears to be no end to its uses, such as for covering the surface of pots or tubs around Palms and other plants; for hanging baskets, for planting around the edges of beds and rockeries; as a ground-work for covering unsightly walls in greenhouses, where it grows freely in sphagnum-moss held to the wall by means of wire netting. There is a golden form, *S. Kraussiana aurea*, and one with the points white-tipped, called *Variegata*, which is the most delicate of the three, and is somewhat subject to damping, on which account it should not be watered overhead.

To have fresh healthy plants of any of these varieties it is necessary to renew the pots or pans every three or four months by filling with fresh soil and inserting small tufts of the fresh points, some two inches apart, all over the surface. A suitable soil is composed of well-rotted sod, leaf-mold and sharp sand in about equal parts. The variety known as *Brownii* also appears to be a form of the above species, but is somewhat harder to handle than any of the foregoing, and is probably most useful when confined to small pots, and requires a lighter and more open soil. We have found a fair percentage of cocoanut-fibre refuse mixed with the soil of great advantage in growing this plant.

The neatest and most compact of all the dwarf-growing forms is the beautiful little *Selaginella densa*, which forms a cushion of lively green, and only grows about one inch high. It is sometimes a little hard to establish, but once started it grows freely, and keeps in good condition for several months without renewing. *S. Martensii* is a free-growing and very useful species, requiring much the same treatment as those described above, but less frequent shifting, and, as it is of stronger growth, it should be planted in larger pans, where it will make nice specimens about nine inches in height. There are several varieties of this, including a variegated

form. *S. involvens* is another pretty species which also includes a variegated form; the average height is about four inches, and the habit of the plant symmetrical and compact, and this, like all the foregoing, requires a greenhouse or intermediate temperature, plenty of water at the roots, but as little overhead as possible, especially during dull weather, when all of them are more or less susceptible to damping.

The *Selaginellas* which require stove or warm-house treatment are for the most part larger, though slower growing species, and require much the same treatment as Ferns. The most convenient method of propagation is by division, rooted portions of the creeping stems being easily procured. Most of them can also be increased by layering of the leaves. Some varieties, such as *S. Emaliana*, propagate themselves very quickly. If the pots are set on a bed of sand or ashes, small particles of the leaves get broken off; these, being very brittle, quickly make roots in the sand and form little plants all around the pots. The species and varieties of this class are so numerous that only a few of the best may be named here. These include *S. tassellata*, a first-rate sort; *S. Victoriae*, *S. grandis*, *S. hæmatoides* and *S. flagellifera*.

The climbing species, *Selaginella Willdenovii*, is another well-known form well worthy of a place in every warm greenhouse. To bring out the true metallic blue tint of the foliage it should be grown in a well-shaded situation. *S. uncinata* also attains a bluish tint under similar conditions. This is a very desirable trailing variety, which, if subjected to somewhat cool treatment, can be partially dried off and rested during the winter months and started up again in spring.

Tarrytown, N. Y.

William Scott.

Late Chrysanthemums.

MRS. JOSEPH THOMPSON is the most beautiful white variety, early or late, which I know. It is an irregularly incurved Japanese of extremely graceful form. It seems to me an ideal Chrysanthemum, not too dense, but with enough florets to make an even globular flower. The upper florets turn in at the tips, leaving just a trace of an opening, where the centre of the bloom should be, but this is completely obscured. The lower petals interlace the stem for two or three inches. The foliage is bold, of firm texture, and although the stem is stiff it is in no way objectionable. The whole plant is healthy and of low growth. It has been in bloom for a month and scarcely yet shows traces of age, except the faintest tinge of pink, and this really adds to its beauty.

Mrs. Emil Buettner, a charming yellow, is equally beautiful, though quite different. This also is a plant of low, stocky growth and of perfect constitution. The bloom lasts a long time in full beauty. It is pleasing to watch the changes the flower undergoes. In the bud stage it is very full, slow in opening, and expands rather flat and radiating, with straight, delicately pointed, strap-shaped petals, broadening and deepening to orange color at the base. The florets elongate from the centre until the bloom is perfectly globular. As the flowers develop, the petals become elegantly twisted and pass from a clear yellow to a straw color, a bloom quite different in build and color from that suggested in the earlier stages.

Mrs. S. T. Murdock is a lovely pink flower of a different form. It is reflexed and less graceful than the two varieties already described. Besides being late, it is valuable on account of its unique coloring. It is extremely lustrous. The surface of the florets is completely covered with crystal-like lenses, which refract the light. For decorations under electric light it is singularly effective. The plant is of luxuriant growth, a perfectly free bloomer, and can always be counted upon to produce a perfect bloom, no matter what bud is taken.

C. B. Whitnal ranks as an old variety, though introduced less than ten years ago, and is retained mainly on account of its distinctive characters. It is a Japanese incurved, but so closely built that the English authorities class it with the truly incurved, or what we used to know as "Chinese incurved." The color is maroon-purple, and, altogether, it is the best dark variety for late decorations, taking the place of the crimson-colored varieties, all of which are earlier.

Wellesley, Mass.

T. D. Hatfield.

Bamboos.

A RECENT note in GARDEN AND FOREST mentioned the hardiness of the Japanese Bamboos in Washington, District of Columbia. They are also hardy farther north. Here, where we have winters which are probably often much more severe on such plants, the roots of the species or varieties which have been tried have stood out without protection about five years, and sometimes the canes have been uninjured. If this were the whole story of the Bamboos, one could

plant them, perhaps, farther north than this with the prospect of gaining in time some novel and striking effects, as these great Grasses are full of character.

Some five years ago I imported a number of species. To be exact, *Bambusa Castillonii*, *B. angulata*, *B. aurea*, *B. nigra*, *B. Quilioi*, *B. Ragamoskii*, *B. Simonii*, *B. viridi-glaucescens* and *B. palmata*, and thought at the time that I had secured some treasures. Here were noble Grasses, normally varying in height from three feet to twenty, and even thirty feet, and they ought to add some novel and striking features to my commonplace garden. The garden is still waiting for the bold effects, my best cultural ability having failed to help the tallest of them to make canes over six or seven feet in height, under which conditions the tall kinds are not at all in character, though, of course, they have some attraction as bold Grasses, and excite some attention on account of their rarity. The cause of their failure to mount and show their true character was rather perplexing at first, but I think it is owing entirely to the dryness of our atmosphere here during the summer. Their native Japan has a warm humid atmosphere during the growing season, and the leaves of the Bamboos are adapted exactly to such conditions, and they do not modify themselves to suit others, as is the case with many plants under cultivation. Bamboos start rather late in the spring and make rapid growth for a few weeks, but as soon as dry weather comes the leaves transpire so freely, the transpiration being unchecked by humidity as in their native habitat, that the nutritive processes are stopped, and the plants fail to make any further important gains. The reason of the failure was not suggested to me until I thought to use some of the growing canes for bold decorations, when it was soon seen that the leaves dried up within an hour or two, though the canes were in water, which would seem to prove excessive transpiration. If any one has grown these plants to specimens in a dry climate it would be interesting to have the details, for it would be a pleasure to be taught that my failure with them is due to some cause or condition that can be remedied.

Bambusa Ragamoskii, being a dwarf plant, was first planted outside, and later removed to a greenhouse, in the humid atmosphere of which it soon took on its true character and broad leaves. No doubt, the taller ones would under similar conditions assume their proper and distinctive features, but this is not hardy-plant gardening.

Elizabeth, N. J.

J. N. Gerard.

Fertilizers for the Orchard.

AT the recent annual meeting of the Indiana Horticultural Society, a paper read by Mr. W. W. Stevens on the Feeding and Care of Orchards contained many valuable thoughts. As to the relation between fertility of soil of the best crops, he said that when a bearing orchard begins to decline in the quality of fruit, lack of fertility is indicated. Orchards should be fed before the fertility is exhausted and the trees become stunted. It is a simple matter to understand that orchards must be fertilized for precisely the same reason that our grain fields and gardens are manured. The fruit removes the phosphoric acid, nitrogen and potash from the soil just the same as cereals and root crops do, and we must keep a liberal supply of available plant-food in the soil for the orchard if we expect profitable returns. In fact, it is more necessary to fertilize the orchard than it is our grain fields, for the reason that on most farms much of the grain produced is consumed by the stock, and through the manure-heap finds its way back to the land, while there is little or nothing that goes back to the soil from the fruit crop that is harvested year after year. We hear the question asked quite frequently, why is it that our orchards are not vigorous and long-lived as they used to be? It is chiefly because they are starved to death. Even the new lands we now clear up are not as rich in vegetable-mold and the mineral elements of the plant-food that make tree-growth as they were a half century ago. In fact, much of our woodland is now pastured until it is half-exhausted before the trees are taken off, or rather die off.

It requires about the same elements of plant-food to make an Apple-tree that it does a Pear or Peach, but when the fruits are analyzed we find quite a difference in their composition. For example:

	Phos. acid.	Potash.	Nitrogen.
100 bushels apples contain.....	1 lb.	10 lbs.	7 lbs.
100 bushels pears, about.....	1½ lbs.	4 lbs.	5 lbs.
100 bushels peaches, about..	2½ lbs.	13 lbs.	6 lbs.

Thus we see that potash is the predominating element in apples and peaches, while nitrogen leads in pears. Apples need 2½ times and Peaches 3 times as much potash as Pears.

It would not be good judgment to use precisely the quantities indicated in the above table to get an additional hundred bushels of fruit. The new wood-growth and foliage must be accounted for, as well as an allowance for some losses through fermentation, bleaching, etc. It is also impracticable to distribute any fertilizer so perfectly as to bring all of it within reach of the feeding rootlets of a tree. I would always advise a liberal use of such plant-food as we are sure our trees need, for a year lost in an orchard by failure to feed it is gone irretrievably.

Whatever we use to fertilize the orchard should be in readily available form, so that the trees can profit from it from the moment it is worked into the soil. Barn-yard manure is not the best thing to use by any means. Its nitrogen is partly available, but the potash and phosphoric acid are not. When barn-yard manure is applied, new wood will be formed in abundance, while the aim of the orchardist should be to have as little new wood as is consistent with bearing spurs, and these spurs will not form satisfactorily when there is too much nitrogen in the soil. Besides, fruit from orchards fed with improperly balanced manures not only keeps and ships badly, but also lacks flavor. The following formulas are suggested for bearing orchards: For Apples, ammonia, four; potash, six; phosphoric acid, two per cent. For Peaches, ammonia, four; potash, five, and phosphoric acid, six per cent. For Pears, ammonia, four; potash, two, and phosphoric acid, four per cent. Acidulated tankage is preferable for the ammonia, or fish scrap, if more convenient. The cheapest potash would be the muriate. The phosphoric acid is most useful as acid phosphate. From 500 to 600 pounds of fertilizer to the acre should be applied and worked well into the soil every year, whether the orchard bears or not.

When these available fertilizers are used the application should be made in early spring, and then there can be no loss of fertility during the winter from surface drainage or leaching. Clover can be grown and plowed under to supply the orchard with the nitrogen it needs, but the potash and phosphoric acid must be spread upon the land, having been obtained from whatever source is cheapest.

When orchards are on very rolling land, or land that washes badly, seed down to Clover and Orchard Grass and cultivate about the trees with the hoe for several years, or until they are old enough to bear. Such an orchard should never be pastured with any kind of stock, and the ground will remain loose and offer a nice mellow bed for the feeding rootlets of trees.

Mr. Stevens does not think it pays to renovate old orchards. The time and labor spent to get them into any sort of satisfactory condition will suffice to start a new orchard that will be a source of profit and satisfaction for half a lifetime.

Experiment Station, La Fayette, Ind.

J. Troop.

From the St. Louis Botanic Garden.

THE so-called Mexican House here might be termed the Show House, since its permanent winter contents are usually in flower, and plants from the adjoining East India House are generally placed in it while blooming because its lower temperature lengthens their flowering season. The prettiest thing in it now is a plant of *Passiflora racemosa* princeps. It was planted out about a year ago in what looks a cramped position, being in a little border barely six inches wide; but the narrow root-space has been mellowed and enriched to a depth of two feet, and the vine has responded by sending out a stem fully thirty feet long and with numerous branches. It is now beginning to flower on the older part of the wood, the racemes being twelve to twenty inches long. The distinct trilobed foliage is ornamental, and the long, gracefully drooping racemes of hanging, bell-like coral buds, headed by sharply rayed flowers, are very effective. It will continue to flower throughout the winter. A thrifty vine of *Bougainvillea glabra* promises well for a good show of its fine blossoms in spring. Other vines in flower are *Stigmaphyllon ciliatum*, which has for some time been gay with bright clusters of Oncidium-like flowers; and *Antigonon leptopus*, that has been flowering for a long time, and still shows dense clusters of rose-pink, oddly shaped, little flowers. To the rafters of the southern side *Cissus discolor* clings, and seen from below the under side of the leaves is almost as brilliant as blossoms. The dwarf-growing *Allamanda Williamsi* is blooming, and will continue to do so all winter. It is planted out here in summer and flowers freely. In the East Indian House *Strobilanthes Dyerianus* is planted out under the middle bench, and throws up thick stalks that are tied to the

bench supports, and make an ornamental wall of foliage from the floor up the length of each side of the bench. Elsewhere, Bouvardias are in full bloom; the deep rose-colored flowers of *Salvia involucrata* make a nice show, and the air is sweet from masses of *Jasminum grandiflorum*.

Brighton, Ill.

Fanny Copley Seavey.

Correspondence.

The Growth of Forest Trees.

To the Editor of GARDEN AND FOREST:

Sir,—This is a study in which I have been deeply interested, and I think there are few men who have given it longer or more careful attention. From boyhood I have been a planter of trees for both ornament and use. My father planted a Horse Chestnut-tree on the day I was born. It is now about eighty feet high, and it requires four long arms to span its circumference, breast-high. This tree was sixty-eight years old the 14th of last May. I own forty acres of choice woodland, mostly Maple, Birch and Poplar, but interspersed with Pine, Spruce and Hemlock. Two of my Pines are over a hundred feet high and perfectly sound. On my lawn, twenty-two years planted, I have several Canoe Birches over one foot in diameter; and in front of another house, formerly mine, stand four Sugar Maples which I planted twenty-eight years ago, and which I cannot span, breast-high, with my arms.

The condition of our New England forest-trees has always deeply interested me; and there was a time, when locomotives were fired with wood and little or no coal was burned, that I feared for our forests. But that period has passed, and I feel able to concur with experts in woodcraft and extensive owners of woodlands, who now declare that there is to-day more and better standing timber in northern New England than ever before since lumbering was there begun. Many seem to fear that the forests are being robbed for the manufacture of wood-pulp. Observation, however, will show that Poplar-trees of the best size for wood-pulp can be grown in a very few years, six to ten; and I think it will not be long before the growing of such wood will become a regular and profitable business on our rocky mountain farms.

The growing of our native nut trees, Chestnuts, Butternuts, Hickorynuts, and even Beechnuts, will, I feel sure, soon become a profitable branch of farming. With proper treatment and care these nut trees can be grown in as large quantities by grafting, in some or all of its methods. It has long been so in Europe. I am rather too far north, or too elevated, for the Chestnut to succeed, but I have half a dozen fine young Butternuts in bearing, from nuts planted about twenty years since, and have recently planted out about fifty more.

The management of our Sugar Maples, when tapped, is being very much bettered; small bits for boring, more shallow holes, and careful after-treatment being now the rule with nearly all our better class of farmers. Agricultural journals are being much improved and better patronized, and their instructions intelligently followed by a rapidly increasing number of readers. Our rural schools are yet far from perfect, but they are improving, and this may be said also of our academies, which are giving more and more attention to the natural sciences, along with mathematics, but in all these lines there remains much room for profitable advance. One of the earliest pioneers in this direction was the late Dr. Ezekiel Holmes, a skillful teacher, who did not despise the working farmer, and was the founder and many years the editor of the *Maine Farmer*. I had the honor and pleasure of his acquaintance for many years, and my interest in horticulture and agriculture was greatly stimulated by his teachings.

Newport, Vt.

T. H. Hoskins.

Utilizing Choke Cherries.

To the Editor of GARDEN AND FOREST:

Sir,—A note in your columns not long ago (see page 388), regarding the utilization of choke cherries, recalls the statement of a friend that in Armstrong County, Pennsylvania, among the jams, jellies and fruits in varied forms nothing was found nicer than choke cherry jelly. The fruit is used here occasionally for pies, and would be extremely popular were it not for the pits. Here is room for the invention of a diminutive cherry-stoner. With one the fruit of wild Black Cherry, *Prunus serotina*, might also become popular; at least, when other fruit is scarce.

An industry of considerable importance in this vicinity—and one which I am informed is to a great extent local—is the

manufacture of jelly from fresh cider, which is boiled down in copper pans. Sweet apples are preferred, and yield a firm, clear and delicious article. Pound Sweets often refuse to "jell," but Early Harvest, Golden Sweet, etc., are always in demand. About two and a quarter bushels is the allowance for a gallon of jelly, though sour apples hold out better than sweet. About fifteen cents a gallon is charged for making it. It will keep for years. It takes the place of boiled cider.

B. L. P.

Variety Tests in the Experiment Stations.

To the Editor of GARDEN AND FOREST:

Sir,—In a recent editorial you put many true things concerning the worthlessness of much variety testing. It seems to me, however, you overlook the value of variety testing as a means of keeping the experimenter posted on the new varieties that are introduced. I find that in my situation this is an important feature if I am to meet the men interested in horticulture in this section and to teach the subject to best advantage in my classes. For this reason I make many tests of varieties each year, and know it pays me well to do so, although I publish but little in this line. The testing of varieties of apples, cherries, plums and pears in this state and section is a matter of much interest to our people, from the fact that we, perhaps, are more isolated in pomological matters than any other part of the country, and the introduction of hardy fruits into this section is regarded as a matter of first importance. We are sifting out the good from a long list of Russian and seedling fruits. The State Horticultural Society appoints ten members, who try the fruits sent them by this experiment station, and report to me direct. We also have a trial station at Owatonna, on the grounds of the State Primary School, devoted entirely to testing apples, plums, cherries and other tree fruits. This station is managed by an able orchardist, and is doing good work. There are also many bright men here who are experimenting along these lines. It seems to me that while the matter of variety testing can easily be overdone, it is a necessary part of the work at many experiment stations.

Experiment Station, St. Anthony Park, Minn.

Samuel B. Green.

The California Buckeye.

To the Editor of GARDEN AND FOREST:

Sir,—Mr. Purdy's reference to the Californian Buckeye, *Æsculus Californica* (see p. 493), reminds me to say that I saw this shrub beautifully in bloom in the south of England in the summer of 1895. The exact date, as I see by my note-book, was July 16th. It was the first time I had seen it flowering, and it pleased me greatly. The flowers were flesh-colored or pink tinted, and made a fine display.

On the same grounds I met with another Californian shrub, hitherto unknown to me, *Castanopsis chrysophylla*. This was bearing little nuts, not unlike those of our eastern Chinquapin, but smaller, being no more than four feet high. I learn from Professor Sargent's account of this Golden-leaved Chestnut in *The Silva of North America*, that although it is a shrub at high altitudes, and a small tree in Oregon and the lower Sierras of California, it becomes a noble tree in the moist valleys of the California Coast Range, where good specimens reach a height of a hundred and fifty feet, with columnar trunks eight or ten feet through and towering to a height of eighty feet without a limb. Above this spreads the broad top, with leaves glossy green above and yellow on the lower surface.

The California Buckeye, too, in its best estate, is said to be a low tree, forming a wide dense head and strikingly beautiful.

Germantown, Pa.

Joseph Meehan.

[See GARDEN AND FOREST (vol. iv., p. 528), where there is a figure of a tree of this Buckeye; with a spread of branches covering a circle sixty feet across. It is not hardy in the eastern states, but in the Mediterranean country, Australia and in other regions where the climate is similar to that of California, it will, no doubt, be planted largely in the future, as it is one of the most beautiful of North American trees when in flower.—Ed.]

Insect Pests in Madeira.

To the Editor of GARDEN AND FOREST:

Sir,—Dr. M. Grabham, while lately visiting the island of Madeira, wrote me (September 24th, 1896) as follows: "It is distressing to see the terrible ravages of the so-called 'blights'

here just now; the gardens are ruined by them, and the fruits, especially grapes, are being fast destroyed. The pests are chiefly an ant introduced from Brazil, which overruns everything, and various species of Coccidæ." A few of the Coccidæ and specimens of the ant were sent. The Coccidæ were, unfortunately, not in a condition to be determined, with the exception of *Aspidiotus rapax* of Comstock, which was in quantity on twigs and leaves of *Stillingia cefifera*, Linné. On the same plant were some young *Lecanium*, apparently *L. hesperidum*. On *Myrtus communis* were some very young scales, apparently of the same two species. On *Sechium edule* a cottony mass with only fragmentary remains, and puparia of some dipterous parasite. The ant I sent to Mr. L. O. Howard, who writes that Mr. Pergande has determined it as *Iridomyrmex humilis*.

Madeira is an island where little or no attention has been paid to economic entomology, but it is evident that there is an ample field for research. Had there been a competent resident entomologist to recognize and take measures against the several pests upon, or soon after, their introduction, no doubt much of the injury described by Dr. Grabham might have been prevented. Even in the absence of such an individual, any resident of the island who may read these lines can do good service by simply collecting specimens of the pests and sending them where they can be determined.

Agricultural College, Mesilla, N. M.

T. D. A. Cockerell.

A Contagious Disease of White Grubs.

To the Editor of GARDEN AND FOREST:

Sir,—In connection with my notes on lawn-infesting insects, published in your journal (see page 472), it may be worth while to speak of some experiments made in the use of a fungous disease, caused by *Isaria densa*, against white grubs. The experiments were first made in France and Germany, and tube cultures have been advertised for sale under the name of "Rose muscardine." According to the directions it was necessary to gather a lot of one hundred or more white grubs and inoculate them carefully with the culture. Then they were to be buried in a specially prepared bed, to remain until they were properly "mummified." Then two or three hundred more white grubs were to be collected, put into this same bed with the mummified grubs, and after these in turn had become destroyed, specimens were to be buried in the infested land at intervals of a foot or so apart. If white grubs were continually collected and placed in the bed of infestation, a supply of mummies, more or less constant in character, could be maintained. It is obvious that this process, while simple enough for a laboratory experiment, is altogether too complicated for use by the owner of a small lawn or garden, and it has the disadvantage of not becoming available for a considerable time after the infestation tubes are received. By the time the owner of a lawn has gathered several hundred white grubs in order to start his disease-bed, it may happen that there are no more of them to be killed off. Furthermore, experiments made in Illinois in the laboratory of Professor S. A. Forbes indicate that the disease loses virulence very soon. It is fair to say that an effort is being made to simplify the use of the germs, and it is now advised that the first culture be made on boiled potatoes, which it seems will support the *Isaria*. By planting the infected potatoes in a prepared bed and covering with earth until the mass has become thoroughly filled with the fungus, it can be taken out entire and spread broadcast over infested lawns. The object is to distribute the disease everywhere throughout the soil, that it may come into contact with the white grub larvæ. Even as the matter stands at present, however, the use of the disease is complicated if it is necessary to employ it from the cultures. If it were possible to purchase at a reasonable rate the dried cakes of material ready to be spread upon the land, the use of this disease might prove feasible. Unfortunately, however, up to the present time it has not been proved that the American white grub is as readily susceptible to the disease as the European, and for the present, at least, resort must be had to other measures.

Rutgers College.

J. B. Smith.

Recent Publications.

The Survival of the Unlike: A Collection of Evolution Essays suggested by the Study of Domestic Plants. By L. H. Bailey. New York: The Macmillan Co. 1896.

This is an attempt, and perhaps the first systematic attempt on any important scale, to extend the theory of

evolution to the practice of horticulture. Few evolutionists have theorized on the vegetable world, speculation in this field having been directed almost entirely to animals rather than to plants. No American writer, at least, has ever assumed any bold position in relation to the development of vegetable life. Darwin studied the life of plants under cultivation as well as under natural conditions, but he did this primarily, and almost entirely, to gather data for establishing and enforcing the general philosophy of evolution, and not to explain cultural practice. Nearly all that is new in the art of gardening has come from direct experiment. In these essays the attempt is made to attack horticultural problems from the opposite side. We do not mean by this that Professor Bailey advocates the abandonment of direct experiment as a help to practice, but rather that this book takes up facts already known as data, and then attempts to explain by reasoning from these data what particular lines of experiment and practice offer the greatest promise. These essays, which have been read at various times before horticultural societies, were prepared primarily for horticulturists. But it is plain that they were prepared also for evolutionists, and in the preface to this book Professor Bailey gives some reasons why he usually selected as a subject for discussion before such audiences some topic associated with the evolution of plants. In the first place he is convinced that many of the common questions which puzzle cultivators can only be answered by appealing to the evidences of evolution. Again he thought that it would be helpful to persons who deal with plants and animals and lead a rural life to have some knowledge of modern speculations in the evolution theory and of the methods of research which they suggest. And finally he wished to make a record of a great class of common facts which have a vital relation with organic evolution, but which are almost entirely overlooked by students and philosophers.

In the first chapter of the book we find an expansion of the thesis that development in the plant world has come about by very slow and gradual transformation, rather than by jumps or sports. This, however, is part of the treatment of the main proposition that the fittest survives because it is unlike everything else. Therefore the study of differences which arise from all sorts of environment, and as a complex resultant of hundreds of forces from without and from within, ought to be the controlling method in investigating the progress of life. A new type with its divergences of character from the old may find a line where the resistance to expansion and growth is less than it was to the parent, and therefore it spreads rapidly under changed conditions. That is, the new types strike out and find fields where competition is less active than in the old ones. Another thesis, which is treated so freshly as to make it appear new, relates to bud variation. In this Professor Bailey attempts to prove that variation of the bud is no more mysterious than variation of the seed, for the reason that in an important sense every branch is a distinct individual which has been exposed to a different set of conditions, and it therefore has the power of reproducing its essential characteristics.

It is not our intention, however, to give any analysis of the contents of the book. In fact, being a collection of addresses delivered at different times and on different occasions, it has not the consecutiveness and unity which would be expected in a systematic treatise, although for some purposes the book is better for its repetitions and its treatment of subjects from different points of view. Certainly the essays must have been stimulating to the audiences of working cultivators who listened to them, since they were prepared for men brought into constant contact with vegetable life, and therefore compelled to observe the phenomena of vegetable growth, but without the training or habit of generalizing or making deductions from facts. A glance at the table of contents will show what an interesting range of topics is embraced in the discussions and will convince any one that it is a good book to put into the hands of any intelligent farmer or gardener. It will give

him new reasons for much established cultural practice, and it will certainly set him to thinking seriously over many problems which remain to be solved.

Notes.

The books on landscape-gardening collected by Henry Sargent Codman and Philip Codman have been presented by their parents, Mr. and Mrs. James M. Codman, of Brookline, Massachusetts, to the Boston Public Library, where they will be placed in a special alcove to be devoted hereafter to works on this subject. The collection consists of some three hundred and fifty volumes, among them many old works of extreme rarity.

Forced dandelion is now seen among the more tender vegetables in a large assortment of holiday offerings and sells for twenty cents a quart. Slender young onions, from New Orleans, cost seven cents a bunch, and tiny radishes, from near-by hothouses, the same price. Lettuce, from Boston, brings ten cents a head, and showy cucumbers, perfectly grown, also from Massachusetts, readily command twenty cents each. Smooth and evenly colored tomatoes from Pennsylvania hothouses cost forty cents a pound, and mushrooms from Long Island sixty cents.

According to the Journal of the Agricultural Bureau of South Australia, Cork Oak trees of good quality have been grown in that region, both soil and climate proving congenial. One drawback to the more general cultivation of the tree is that it has been difficult to get the acorns which come from Europe to germinate, but now the trees originally planted in South Australia are fruiting abundantly, so that there will be little difficulty in obtaining seedlings. The trees planted in Mount Lofty about forty years ago are growing vigorously and they are old enough now to produce a crop of cork.

Dr. Rothrock calls attention in *Forest Leaves* to the observation of Dr. Evermayer for the Bavarian Government, who declares that the evaporation of moisture from a forest area, including transpiration from the leaves, exceeds by fifty per cent. the evaporation from a water surface in the open, and if, therefore, we cut off great areas of forest it is not improbable that the surrounding atmosphere is much less humid, and for this reason the ground will dry out much more rapidly. This will account to a certain extent for the killing quality of the droughts in some recent years. A diminished rainfall alone will hardly account for their severity, but if we couple with this the fact that evaporation from the ground is more rapid, we have some additional reasons for the extreme dryness which has prevailed.

A correspondent inquires if it makes any particular difference what staminate varieties of Strawberries are set among pistillate plants in order to fertilize them. Whether the pollen parent does anything to modify the size, flavor or color of the berry is a question that has been very energetically discussed, but growers pay little attention to the quality of the fruit of the perfect-flowered plants and a good deal to the question whether they are strong growers and abundant producers of pollen. It is essential, however, that the plants which produce this pollen should blossom at the same time with the varieties which they fertilize. For example, Mr. Paddock states in a recent bulletin of the New York Experiment Station that Michel's Early would not be a proper variety to plant with Bubach, because the first blossoms of the latter will hardly be open before those of the former are in full bloom or past their best.

Among the plants which are to be sent out by the California Experiment Station next year will be a few seedling Silk-Cotton trees in small pots for trial in the warmer districts of that state. The lustrous light fibre known as "silk-cotton" and used in upholstery is a product of this tree, *Eriodendron anfractuosum*, and if it can be grown in that state it would be a valuable addition to the economic plants. Since the tree is a native of the southern part of India, however, it cannot be expected to flourish except in places which are entirely frostless. The Carob-tree, *Ceratonia siliqua*, has been raised from seed in Alameda County and has already borne fruit. This tree is about as hardy as the Orange and valuable, owing to its drought-resisting qualities, for planting on dry hillsides as well as on richer lands, where it produces excellent food for cows and swine. It is a handsome tree, the true Algaroba or St. John's Bread of the Mediterranean regions. A late bulletin of the Experiment Station at Berkeley announces that several pods of the Carob-tree will be mailed to applicants for five cents.

Nine cargoes of Oregon fir have recently been loaded at Port Blakely, Washington, to be used in the construction of a dry dock in Plymouth, England. According to the *Timber News*, of Liverpool, the Creedmore carried 1,100,000 feet, the Kennebec 1,500,000 feet, the John Briggs 1,430,000, and so on, making a total of 11,000,000 feet. It must be a spacious dry dock which will need so much timber and plank, for, as the *Northwestern Lumberman* remarks, this will be enough to fill up a big Chicago wholesale lumber-yard. Besides the small lumber that has started on its long journey around Cape Horn, there are more than 10,000 pieces of timber which range from twelve to twenty-four inches square and from forty-five to eighty-three feet long, and the *Lumberman* remarks that nowhere on the earth can such a lot of timber be found near water where such large ships can be loaded. The deep waters of Puget Sound enable ships to take these enormous cargoes at the very mill wharves.

Concord and Catawba grapes are still quite plentiful and sell for fifteen and twenty cents for a basket holding four pounds of the fruit. Trimmed bunches of Almeria or Malaga grapes cost twenty-five to thirty-five cents a pound. The direct importation of these Spanish grapes is confined to October and November, though a few lots come by way of Liverpool in December. This year the receipts in this city from Spain amounted to 139,339 barrels of about sixty pounds each, and prices were remarkably even throughout the unusually short selling season of five weeks. One shipper realized an average of \$5.25 a barrel on all the grapes forwarded, while an invoice of 1,000 barrels netted the exporter \$6.12½ a barrel. The highest price reached during the season for an exceptionally fine lot was \$11.12½ a barrel. Large-berried Gros Colman grapes are coming from Liverpool in perfect condition, nine of the immense bunches in a box about fifteen inches square, suspended from three slats and well held in place with cork-dust. A pound of this showy fruit costs \$1.75 to \$2.25.

Never before have citrus fruits reached this city from so many sections, and the range and variety is, consequently, remarkable. A choice of oranges may be had from Florida, Jamaica, Cuba, the Bahamas, California, Arizona, Mexico and the Mediterranean. Grape-fruit is coming from Florida and Jamaica, and shaddocks from the latter place. Grape-fruit sells for \$1.00 to \$2.00 a dozen, Florida oranges sixty to seventy-five cents, and California Navel for the same price, oranges from Jamaica costing slightly less. Mandarins, light-colored and of good size, with distinctive musky flavor, come from Sicily and from Florida, and sell for thirty to sixty cents a dozen. Smaller Tangerines, of deep rich color, reach us from the same state and from Jamaica and California, and their comparative scarcity here has induced large shipments from Japan. This seedless fruit from Asia is considered of better flavor than that from California, but not equal to the Florida fruit, which commands sixty-five cents a dozen. Valencia oranges are exceptionally good this season, and sell as high as \$5.50 a case at the wholesale auctions, the best Messina oranges reaching \$2.25. Lemons, from Spain and Sicily, are of good quality, plentiful and unusually cheap for the holiday season, costing fifteen to twenty-five cents a dozen. The immense total quantity of oranges alone is indicated by the fact that now, at the beginning of the season for Mediterranean oranges, 32,700 cases of Valencias have already been received at this port, while up to December 17th 214,124 barrels and 29,926 boxes of Jamaica oranges have arrived.

We have lately received from Dr. Franceschi an interesting note in regard to Mr. Kinton Stevens, an Englishman by birth, who came to California more than twenty years ago, and began planting at Montecito specimens of Palms and tropical trees which have made his garden one of the most attractive and interesting in southern California. Mr. Stevens died recently, but his garden contains such treasures as two plants of *Cocos plumosa*, thirty-five to forty feet high; an *Erythea armata*, which has bloomed for the first time in cultivation; a *Jubæa spectabilis*, twenty feet high, and flowering specimens of various other Palms. Besides this, the garden displays Mango-trees in fruit with *Eugenia Brasiliensis* and *Monstera deliciosa*, which have also ripened fruit here for the first time in California. He was entrusted by the Board of Park Commissioners of San Francisco to collect Palms, Tree Ferns and other interesting plants from Hawaii, in which he was very successful, and he was a pioneer in planting Avocado Pears in the state. Mr. Stevens was cut off in the midst of his usefulness, but his memory will live in the beautiful plants with which he enriched the gardens of his adopted state.

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Forestry in Pennsylvania.

THE publication of the *Report of the Forestry Commission of Pennsylvania*, being the second part of the Report of the Department of Agriculture for 1895, marks the first serious attempt of a study of the forestry question in Pennsylvania. Whatever has been done previous to this was not only very fragmentary and partial, but was also local. Here, however, we have the first report of a commission appointed in May, 1893, and sent to the Legislature on the 15th of March, 1895. The long delay in publication is presumably not intentional, but is due to the chronic condition in printing state documents, joined to the disastrous fire of over a year ago, the effects of which have not yet been overcome. It is not to be supposed that less than two years would give an exhaustive and complete report of so wide and diversified a state as Pennsylvania, with its sixty-seven counties and 45,000 square miles of area. Nevertheless, we have the beginning of a personal canvass of that portion best fitted for forestry purposes; the results of a number of special inquiries; lists of the trees native to the state, with ample and instructive notes on their character and their economic value and hints as to their propagation, and a very suggestive summing up of forestry prospects, together with recommendations for future policy and effort.

It appears that the so-called forest lands comprise a little less thirty-three per cent. of the state, ranging from about six per cent. in Bucks County to ninety-two in Pike County. But these, as it is truly said, should rather be called waste than forest lands, since they have been in large part cut over, and in many cases are now totally unproductive. This fact is very forcibly brought out by a table of the lands advertised to be sold for taxes during the year 1894. They comprised 2,358 square miles, or about five per cent. of the entire state. They were located in thirty-one of the sixty-seven counties, and varied from a few acres in some to 190,000 in McKean County; comprising, in this latter case, twenty-nine and five-tenths per cent. of the area of the whole county. More or less field-work was done over nearly half the state, the most attention being given to the more mountainous districts and those most closely related

to the Delaware and Susquehanna watersheds. It is unfortunate that the time set for the completion of the report did not permit more work of this character, for in no other way can the facts necessary for the proper stating and solution of the problem be obtained. We hope, however, that this may be done in the near future, since a permanent office of forestry commissioner has now been established.

Six tracts, ranging from 200 to 2,000 square miles, are defined as of such nature that they are fitted for forest reserves. They are quite irregular in outline, and each comprises parts of several counties. The Pocono tract, in the north-east, as the source of the Lehigh and other waters draining into the Delaware, and the Lycoming tract, farther west, the source of the bulk of the water of the west branch of the Susquehanna, are specially recommended for this purpose, not only because of their influence on the water-supply, but also because they are unfitted for other profitable use. It is shown that tree-growth is here profuse and recuperation rapid, so that if adequate protection could be afforded reforestation would not be a difficult matter. It is to be hoped that this recommendation may receive due consideration and the commissioner may be authorized to perfect a plan for securing the control and providing for the management of these Reserves. The danger from fires, while frequently mentioned, and the subject of one or two special inquiries, has not, relatively, the space allotted to it that is often given. Presumably this is because no new facts have been discovered in relation to the cause or prevention of these disasters, and it is not worth while to be threshing old straw.

A letter, called "A practical man's experience in timber restoration," gives a concrete illustration of the difficulties that beset efforts to manage a forest property upon common-sense business principles, "owing to the poverty, ignorance, stupidity and crime of the people about it." These people resented efforts in forest restoration as an affront to their vested rights of hunting, berry-picking and pasturing, so that after several years of labor the man who bought 1,200 acres of woodland for the purpose of saving the timber and demonstrating what can be done to develop forest-growth has nothing to show except a heavy bill of expense. He summarizes the whole situation, not only for his case, but for the whole state, by saying, "if the laws could be so amended as to give the landowner proprietary rights in whatever his land produced, whether it be trees, grass, herbs, birds or fishes, and inflict heavy penalties and give damages, . . . then all sorts of trespasses would be quite rare, and in time we might hope to see a decent growth of timber over the thousands of square miles of what is now desert and waste land." We must confess that we do not share the cheerful optimism of this philanthropic citizen, for it ought to be understood that he did not undertake this work so much with the personal expectation of personal profit as to give an object-lesson in forestry for the example of others. Laws will not enforce themselves, and unless there is an educated public opinion behind them they are worse than a dead letter on the books. It appears that this man complained to justices, to district attorneys and to county detectives, but received no help. Of course, it was unfortunate that there was no Justice of the Peace for twenty miles in any direction, but the chief trouble is that courts and juries prefer the old ways and will not consider it an offense or a crime if their neighbors do only what has been the habit of the country from time immemorial.

Forty-seven full-page plates illustrate the report and show some characteristic trees and forest views; they also show by contrast what we have and what we might have, in an exceedingly instructive way. It should be added that Dr. J. T. Rothrock, to whom the bulk of this report is due, is now the Commissioner of Forestry of the state, and has been untiring in his labors for the forestry cause. In the farmers' institutes and at other gatherings he has continued to give illustrated lectures upon the subject. These have proved very popular, and the

leaven thus introduced ought at last to permeate the whole mass of the people and bring about a clearer understanding of what forestry is, and what, when supported by public interest and opinion, it may reasonably be expected to do for the commonwealth. The fact that Pennsylvania has such an officer as Commissioner of Forestry, and that the state publishes and disseminates every year a careful report on the condition of its woodlands, is of itself a distinct gain, for it means education. What the commonwealth needs is enlightenment, and after this will follow necessary laws and their enforcement.

Fertile Crosses of Teosinthe and Maize.

PROFESSOR A. DUGÉS sent in 1888 to the Cambridge Botanical Garden, Cambridge, Massachusetts, several Maize plants which he collected at Novo Leon, Mexico. Seed was sown at the Garden, and the resulting plants were studied by the late Dr. Sereno Watson.* Seed from the second generation of the Cambridge plants was procured and planted in Philadelphia, developing into Corn, which formed the basis for the botanical description of Maize in *Maize: A Botanical and Economic Study*,† published in part second, volume first, Contributions from the Botanical Laboratory of the University of Pennsylvania. Later inquiries were made of Dr. Dugés concerning his discovery, and the following letter in French and dated Guanajuato, September 22d, 1895, was received:

The maize which Dr. Sereno Watson named *Zea canina*, after the examples which I sent him, is known in Mexico as "Maiz de Coyote" (*Lupus latrans*), "Teosinthe," "Asesé," or "Café de Tabasco." We have considered it as *Euchlæna luxurians*, *Euchlæna Mexicana*, or *Reana luxurians*. It appears that it has been cultivated in Europe and also in Mexico, where it has been grown by Professor José C. Segura, Director of the School of Agriculture at Mexico. This botanist discovered at the end of three years of careful cultivation in good soil that it changed to *Zea mays*, and that if abandoned to itself under adverse conditions it reverted to *Zea canina*; that is, the same plant has a wild and a cultivated state. You are at liberty to address on my part Professor Segura, who will be pleased to give you the details.

Some time elapsed after the receipt of the above letter, when a letter was addressed to Professor Segura, of the School of Agriculture, Mexico, who replied in Spanish, under date of July 2d, 1896:

In reply to your letter, the manifest which I sent you with the bags of seed explained that one bag contained seeds of *Asesé* (*Euchlæna Mexicana*); another seeds obtained by hybridizing *Euchlæna Mexicana* with common Maize. In consequence, that which you term *Zea canina*, Watson, is not, but the result of the hybridization of *asesé* with Maize. To obtain this product, which is known in Guanajuato under the name "Maiz de Coyote," and which you classify with maize, sow three grains of the *Asesé*, and at a distance of 0.80 m. three grains of Maize. As a result of the sowing in the month of July, the *Asesé* commences to shoot out its floral peduncle, which should be cut off immediately after it appears [emasculatation]. In August, when Indian Corn flowers, the *Asesé* is fertilized with pollen of Corn.‡ Harvest in October, and the grains, upon examination, do not show any modification in their form. The succeeding year sow the seed and a plant of early habit will result, showing, in its small-sized ears, qualities and appearances produced by the fusion of the ears of common Maize with the ears of the *Asesé*, grains of which I have sent you.

Kernels of both Teosinthe and Maize were sown in Philadelphia and the result of the planting watched with interest. Before the plants had fully matured I went to Mexico and visited Professor Segura at the National School of Agriculture. Professor Segura became very much interested and showed all the stages in the hybridization of Teosinthe

with Corn, and very generously placed at my disposal a series of specimens, permission at the same time being given to publish the results of the experiments.

Professor Segura has been carrying on his experiments for the last five years. Maiz de Coyote was for a long time known in Guanajuato as a very peculiar form, whose origin was unknown. Professor Sereno Watson, to whom specimens were sent, described them as a new species, *Zea canina*, not recognizing them as of hybrid nature.

The writer, who believed this form to be primitive, and Professor Watson were both misled. Professor Segura discovered its origin by accident, some very peculiar plants having been found in a crop harvested from a field where Corn and Teosinthe had been planted together. He wisely experimented and conclusively demonstrated that Maiz de Coyote was not specifically distinct, but of hybrid origin.

Teosinthe, *Euchlæna Mexicana*, Schrad, is a plant of several varieties native in Mexico, where the writer found it growing wild in the Barranca Chica, near Guadalajara. It is grown as a fodder-plant in most warm countries, seldom flowering when planted in Europe. The two ranked ears are clustered in the axils of the leaves, and have the one fertile and one rudimentary flowers placed in a hardened cup-shaped depression of the rhachis. The male spike, terminally borne, consists of two flowered spikelets, with three stamens each in every flower. When Teosinthe is crossed with Maize by the use of Maize pollen, the hybrid progeny of the first generation shows a shortened branch in the axil of a leaf with three or four ears clustered together and surrounded by leaves which are commonly called husks. These ears resemble very much those of Teosinthe in that they are two ranked with the kernels in the hardened depression of an enlarged zigzag rhachis, which shows the beginning of a cob-like axis, on which, in this case, the grains are disposed in a distichous manner. The kernels are larger, sharp-pointed and protrude between the chaffy scales (glumes) from the cup-shaped depression of the axis, which is, in this case, shallower than in Teosinthe. The outer glume, which is hard in Teosinthe, becomes larger and softer in the hybrid progeny. The axis is still firm, glossy and chitinous. The second year, Maize pollen is again used to cross with the hybrid plants of the first generation. The result of this cross is a form of ear in which the kernels are larger, fuller and more rounded, while the corneous basin-shaped depression has become smaller and more shallow. The kernels in this generation are usually arranged in a distichous manner. The third year, pollen of Indian Corn is again used, and the resulting ears are found to differ in the increase of the number of rows of grains, four or more being present; the pithy axis, or cob, now becomes demarcated, and is seen when the ear is broken transversely. The plants of this year and of the fourth are evidently those described by Professor Watson under the name *Zea canina*, and as primitive ones by myself.

A very fair, but reduced, illustration of the ears of the fourth hybrid generation is to be found in the publication referred to in the foot-note, plate xv., fig. 9, of the monograph on Maize already referred to. The kernels of this generation are somewhat top-shaped, three-eighths of an inch long, white and sharp-pointed. The ears are usually clustered together on a shortened branch, although in some cases one ear may have taken the lead, having several smaller ones at the base, as is to be found frequently in ordinary Field Corn, when the husks are carefully removed.

What, then, is the nature of Corn? Several views may be taken by the light suddenly thrown upon the origin of the plant by these interesting cross-breeds or hybrids.*

(1) That Maize is generically and specifically a distinct plant. This is the view accepted by systematists and the one current in botanies and floras generally.

* Up to this point the results of the cross have been termed hybrids, because the view was taken for clearness that two distinct species were used. We now designate according to the theory proposed the unions of two different varieties, as cross-breeds, of two different species, as hybrids.

* Watson, *Proc. Amer. Acad. Arts and Sci.*, xxvi., 158.

† Review, 1894, GARDEN AND FOREST, vii., 23.

‡ It should be noticed here that the two plants are monoecious and protandrous; the order of flowering is as follows at Mexico: Male flowers of *asesé*, then female flowers of *asesé* and male of corn produced synchronously, then female flowers of Maize, so that the physiological arrangements in both plants in Mexico preclude the use of pollen of *asesé* in the fertilization of Maize.

(2) That Maize, as we now know it, owes its origin to the crossing of Teosinte, as one of the parents, with the pollen of an extirpated closely related grass, and that the progeny of this cross by variation under cultivation produced ears of considerable size, with kernels of great nutritive value. If this hypothesis is accepted, then the proposition is proven that many species, which are botanically recognized as such, have had a hybrid origin, as, for example, the contested case of Bartram's Oak.

Dr. J. M. Macfarlane's observation as to the possible origin of species from hybrids is apropos:

Hitherto it may be said that authorities, with few exceptions, have declared wholly against the view that hybrids may be sufficiently fertile, and their progeny sufficiently strong and adaptable to be fitted for survival, not to say increase, in the struggle for existence. The admirable experiments conducted by Wichura on Willows go far to prove, one would think, that by the fourth or fifth generation enfeeblement and decay become so marked that continued production fails. But against this is to be placed the fact that many of our horticulturists are ardent believers in the continued fertility of hybrids, as witness the article by Professor Meehan, already cited, although we believe an oversanguine expectation is sometimes entertained under this head.*

When one finds the undoubted hybrid between *Geum rivale* and *G. urbanum*, frequently described by systematists as a species, and that in many places the hybrid is nearly or quite as abundant as either parent, that it freely produces good seeds, and further that it has, as we have already indicated, many points of superiority as a combined organism which neither parent possesses separately, we have good reason for the exercise of caution before pronouncing decisively against species production from hybrids.

(3) That Indian Corn is the result of a cross between Teosinte and a race or variety of the plant produced by successive cultivation of the wild plant until its characters as a variety or a race have become fixed. This may have taken place under irrigation, where the conditions of growth are more or less under absolute control. It is probable that the early cultivation in Mexico began as a shallow scratching of the soil for water distribution, and that the early cultivation was near the springs and watercourses. As many of these rise in the hills, hill or mountain culture was the first practiced. The wild plants, therefore, chosen for such cultivation would under such feeble farming tend to vary but slightly from the original form. As the population, however, grew more dense and the water privileges possible through this imperfect system of irrigation more restricted, new methods of engineering were of a necessity adopted by the primitive husbandman. Deeper and longer ditches were dug, reservoirs constructed and cultivation in the lower-lying levels thus became possible through better water distribution and impounding. That this was the way in which cultivation by irrigation began is proved by the ancient irrigating works to be found on the hills long since abandoned. Such are to be found in Seriland, according to the observations of Professor W. J. McGee, of the Bureau of Ethnology † With the more extensive cultivation in the valleys through a better regulated water-supply, the plants naturally lost their feral characters and became more and more domesticated in appearance. It is at this point in the culture of plants, when agricultural methods have become more or less stable, that the fixation of certain races or varieties of field plants may be said to have taken place. Such a fixation of Teosinte, as an agricultural race, may have taken, or probably did take, place. It was then that the presupposed cross between Teosinte and its variety occurred. That this cross would produce some interesting results is corroborated by the behavior of other plants. Spontaneous hybrids are, as a rule, much more variable than those produced artificially—for example, *Verbascum lychnitis* × *Thapsus* and *V. lychnitis* × *nigrum*. Professor Bailey ‡ says:

You want varieties quickly, and they must be distinct. You

turn at once to hybridization. Hybridization is nominally rare. There is no proof that nature made a species or potent form in this way.* But she mildly crosses one species with itself, and out of the slightly variable offspring selects those which are best adapted to the place in which they live, and uses them for the subjects of another congenial cross, and so the family marches on from generation to generation, each step slow, but each one sure.

It is probably in such a manner that our cultivated Corn, originally a cross breed,† may have arisen.

The specimens which were grown in Philadelphia during the season of 1896 from seed of the fourth hybrid, or, according to the last view expressed, fourth cross-bred generation, followed, in their vegetative parts, the horticulturist's rule,‡ that

Crosses of different races and species are distinguished from plants of a pure race, as a rule, by the power of vegetation. Hybrids between very different species are often very weak, especially when young, so that it is difficult to successfully raise the seedlings. On the other hand, crosses of more closely related species and races are, as a rule, uncommonly luxuriant and strong; they are distinguished mostly by size, rapidity of growth, early flowering, abundance of flowers, longer life, stronger reproductive power, unusual size of some special organs, and like characteristics.

The Philadelphia plants reached a height of twelve feet, grew rapidly, were of long life and produced at nearly all of the nodes below the ears strong aerial roots.

If we consider Indian Corn to have arisen as a cross-breed, or hybrid, we have an explanation as to many of the teratological specimens of Corn frequently found in field and garden cultivation. These teratological appearances may be explained by reversion, or may be simple malformations. It is a well-known fact that malformations and curious forms are much more common, especially in the flower parts of hybrids, than in individuals of pure descent.

In conclusion, if the latter supposition is the correct one, it is probable that the wild ancestor of Maize is the Teosinte, *Euchlæna Mexicana*, because nature avoids hybridization on account of the sterility of the offspring, thus generally precluding the possibility of a cross between two distinct genera or species, and, secondly, because it is found by common experience that the fertility of a plant is increased by crossing two varieties of the same species which have been produced under differing conditions, or in different geographical localities, such as would be found in the case of Teosinte and the agricultural race produced through successive advances in methods of irrigation. If the above view is not accepted, the fact that Teosinte and Maize can be crossed and a fertile progeny result shows that the two plants are united by the close and intimate bonds of kinship.

University of Pennsylvania.

J. W. Harshberger.

Landscape Effects at Kew.

THAT part of Kew which formerly was known as "The Wilderness," or Pleasure-grounds, and which is now designated The Arboretum, consists of about one hundred and eighty acres of what is now by far the most picturesque scenery in the gardens. In 1850 Sir William Hooker was instructed to take charge of it and form "an arboretum, or classified collection of hardy trees and shrubs on a scale worthy of the nation." It was then "a large area of wooded and scrubby ground devoid of interest or picturesque effects"; it is now richly stocked with trees and shrubs from all parts of the world, and at the same time it is "a paradise of trees and song-birds, shady glades, well-planned vistas, bold sweeps of green lawns, and set in the midst of it a lake whose banks and islands are so skillfully planted with tastefully grouped tree and shrub and herb that artists of repute spend months in making pictures of the views it affords. The lake was made by

* 1892. *Transactions Royal Society of Edinburgh*, xxxvii., 283.

† *Science*, N. S., iii., 493.

‡ 1896. L. H. Bailey, *The Survival of the Unlike*, 177.

* *Vide ante*.

† *Vide ante*, foot-note.

‡ 1895. L. H. Bailey, *Plant Breeding*, 225.

Sir William Hooker about forty years ago, and any one looking at it now, with its undulating banks and mounds, would find it difficult to realize that it was once perfectly flat ground. The islands and banks are so designed that the extent of the lake cannot be seen from any one point. Its area is about five acres, and it is supplied by water from the Thames, which runs close by, separating Kew from its once famous neighbor, Syon Gardens, the demesne of the Duke of Northumberland.

The conifer garden extends all along the south side of the lake, while placed about its margin is the collection of Willows, the Alders being conspicuous on some of the slopes. Large trees of Oak, Elm, Poplar, Lime and Chestnut are prominent features in the views to be seen from various points. In the water itself, or fringing the margin, are Irises, Sedges, Docks, Reed-maces, Water-lilies, etc. There are also numerous water-fowl, which undoubtedly add to the charm of the scenery, although at the expense of many aquatic plants. A collection of Marliac's hardy *Nymphæas* is being made a feature of at one end of the lake. In the summer Daffodils, Poet's Narcissus, *Primula Japonica*, *Spiræas*, etc., help to give beauty to the scenery.

About two years ago two eminent painters, Monsieur and Madame de l'Aubinière, came to Kew, and, falling in love with its lake scenery, they painted a large number of pictures representing its various views. These, with the permission of the authorities, have since been exhibited in a small gallery in the gardens. Recently, twenty-four of the most suitable of these pictures have been reproduced by a photographic process, and these, with an introduction from the pen of the Director, Mr. Thiselton-Dyer, are now issued in the form of an album entitled *The Poetry of Kew Gardens*. One of the pictures is reproduced on page 525. The following extract is from the introduction:

"Visitors to Kew who admire its stately trees, its sylvan glades and its spacious lawns, probably in most cases suppose that Nature endowed it with its charms, but this is far from being the case. Kew throughout is the creation of the art of the gardener, applied continuously for a century and a half, and never, even at the present day, ceasing to modify, develop and refine.

"Landscape-gardening as exemplified in such a domain as Kew is peculiarly English. It originated, no doubt, partly in an intelligent appreciation of the possibilities afforded by the climate, which allows smooth turf to grow in a manner unknown in other countries; partly in the demand for giving to country mansions harmonious and sympathetic surroundings. Its evolution has been gradual, and it is not without interest to notice that Kew has been the scene of the earliest attempts of its successive masters. . . . There seems reason to believe that in the main features, which still survive, it was the work of Kent, who has been termed the founder of the school of landscape-gardening. 'Capability Brown' was also employed by the Dowager Princess of Wales to remodel the western half of the gardens, and Kew owes to him some beautiful features, among them the beautiful Hollow Walk, now devoted to *Rhododendrons*."

Kew may be taken as an excellent example of what can be done to make a rich botanical collection and at the same time a garden filled with picturesque scenery. In the words of Mr. Dyer, it proves "that it is possible to construct a great botanic garden which shall sacrifice nothing to its object and yet be neither arid nor ugly."

London.

W. W.

Each of us is constituted with a special idiosyncrasy related in some mysterious way to certain ideas of natural scenery, and when we find ourselves in a scene answering to our idiosyncrasy the mind feels itself at home there and rapidly attaches itself by affection. The influence of scenery upon happiness is far greater than is generally believed. There is a nostalgia which is not exactly a longing for one's birthplace, but a weary dissatisfaction with the nature that lies around us, and a hopeless desire for the nature that we were born to enjoy.—*Philip Gilbert Hamerton*.

Foreign Correspondence.

London Letter.

BEGONIA BAUMANNI.—Although introduced from Bolivia six years ago and described and figured as a large-flowered, sweet-scented tuberous *Begonia*, this species has somehow failed with us as a garden plant. It has been tried every year at Kew without success until this year, and then it was only by very careful treatment that it was got to anything like perfection. Is there any special "wrinkle" in its cultivation? I have read that it is grown well by American cultivators. Here the tubers have been started at the same time and treated along with the other Andean species, *Boliviensis*, *Veitchii*, etc., but they did nothing. A plant planted in a bulb-house in a bed of light soil near the glass grew and flowered well, and a figure of it was prepared for *The Botanical Magazine*. It has fleshy reniform leaves; the nerves, petioles and stems are colored rose-red and the scapes are a foot high, bearing three or four flowers, the males with four petals and three inches across, the females with five petals and two inches across. They are colored rich rosy red and are very sweet-scented. Has any one crossed it with other tuberous species?

CONANDRON RAMONDIODES.—We have just repotted our plants of this pretty little Gesneriad from Japan, and I am reminded to call the attention of American cultivators to its merits as a pot-plant. It has a short, fleshy stem or rhizome, clothed with long, soft brown hairs. The leaves are oblong-lanceolate, not unlike those of the common Primrose, and they form a cushion-like tuft suggestive of the Pyrenean *Ramondia*, a near relation of *Conandron*. Unlike the *Ramondia*, however, they are glabrous and deciduous. The flowers are borne in cymes on slender suberect scapes six inches long, and they are star-shaped, an inch across, and colored rose-red with a darker zone round the eye-like clusters of orange-colored stamens. In its regular perianth this plant is singular among Gesneriads. The flowers are developed profusely in June, July and August. At Kew it is grown in a cool, airy house along with Cape bulbs, where, this year, it was a delightful little picture when in flower. It likes an open light soil and plenty of water all through the summer. It was introduced by Veitch through their collector, Maries, about eighteen years ago, but is still a rare plant.

JACOBINIA COCCINEA.—Among the numerous *Acanthads* grown for their flowers in winter this is one of the handsomest. It has smooth cylindrical stems, glossy green glabrous, ovate-lanceolate, long-stalked leaves from three to nine inches long, and erect terminal spikes of bright crimson flowers springing from ovate green bracts. The flowers are tubular, slightly curved, two inches long and divided at the top into five segments, the two upper ones forming a sort of hood to the stamens, the three lower spreading and labellum-like. Grown from spring-struck cuttings in a sunny frame or greenhouse during the summer, bushes with about half a dozen stems eighteen inches high are obtainable; or the plants may be limited to a single stem and thus induced to make exceptionally strong flower-spikes. There is a comparatively worthless plant in cultivation under this name. The true thing is figured (poorly) in *The Botanical Magazine*, t. 432. It is a native of Brazil. We had some plants of it in flower in October. This and the best form of *Jacobinia magnifica*, sometimes called *Pohlana*, are two of the best *Acanthads* we grow.

CRASSULA RUBICUNDA.—This is a good winter-flowering greenhouse plant. It has been attractive at Kew since the middle of November, and it promises to continue so until Christmas. It forms a compact little shrub fifteen inches high, the stems erect, branching naturally from the base and again near the top, where it forms a broad, loose, dichotomous cyme or head of flowers which measures nine inches across. The leaves, which are about four inches long, are arranged closely upon the stem from the



Fig. 75.—View in the Royal Gardens, Kew.—See page 523.

base upward in opposite pairs, and they are linear-lanceolate, channeled, succulent, bright green, the margins clothed with fine hair-like spines. The flowers are very numerous, and they are erect, urn-shaped, a quarter of an inch across, colored crimson, with yellow anthers. The leaves root freely and produce young plants in a few weeks if placed upon a pan of moist sand in a warm house. Grown along with and treated the same as the popular *Crassula coccinea*, this plant would, I believe, prove a good market plant. It was first introduced from south Africa by Mr. Wilson Saunders, and flowered in his garden at Reigate over twenty years ago, but it has not yet attracted the attention of horticulturists. This may be due to the fact that a much smaller and less attractive species—namely, *C. impressa*—has been grown by the nurserymen and in the parks here under the name of *C. rubicunda*. This also is a native of south Africa. It forms compact little tufts, three or four inches high, of erect slender stems, bearing semiterete, purple-tinted, pock-marked leaves two inches long and small terminal heads of dull red flowers. Another name for this plant is *C. Schmidtii* (see *Gartenflora*, t. 1225). A third species of somewhat similar character is *C. recurva*, introduced to Kew from Zululand along with *Streptocarpus Dunnii*. It has fleshy stems a foot high, thick, recurved, down-clad leaves and terminal heads of dull red flowers. When grown in bright sunlight the whole plant becomes a rich vinous-red color. Another good winter-flowering greenhouse species is the old *C. lactea*, of decumbent habit, with fleshy heart-shaped leaves and erect racemes of pure white flowers. *C. falcata* is also deserving of general cultivation for the conservatory in midwinter.

GREENHOUSES IN DECEMBER.—There are so few really good plants that are to be relied upon to flower under glass in December that a list of them is surprisingly short. The Orchid-houses are, perhaps, the richest in flower display, although, except *Dendrobium*, *Phalænopsis*, *Cattleya labiata* and the forms of *Lælia anceps* and *autumnalis*, we have nothing additional to what there was twenty years ago. *Odontoglossum crispum* is always in flower. *Cypripedium insigne* is good in December, as also are the *Calanthes*, *Oncidium varicosum*, *O. Forbesii*, *Cattleya maxima*, *Angræcum eburneum* and *Phalænopsis* of sorts. In the stove *Brownea Crawfordii* is magnificent; hybrid *Anthuriums*, *Poinsettias*, *Euphorbia jacquiniæflora*, *Begonia Socotrana*, *B. Gloire de Lorraine*, *B. Winter Gem*, *B. President Carnot*, *Ruellia macrantha*, *Jacobinia coccinea* and *Costus igneus* are the chief attractions on the stages. Among climbers the best are *Ipomœa Horsfalliæ* and its varieties, *I. rubro-cœrulea* and *Manettia bicolor*. The cooler houses look dull after the departure of the *Chrysanthemums*. Of course, there are forced flowers, such as Roman *Hyacinths* and *Narcissus* and the useful *Cineraria*, *Primula Sinensis*, *Bouvardias*, *Arums*, *Persian Cyclamen* and various *Ericas* and *Epacrises*. Less common plants in flower now are the *Reinwardtias*, *Mackaya bella*, *Tecoma Smithii*, *Luculia gratissima*, *Pleroma macrantha* and several species of *Statice* from the Canary Islands. The most attractive climbers are several species of *Bomarea*, *Senecio macroglossus*, *Hibbertia dentata* and *Lonicera sempervirens*. A few *Nerines* remain, but the best of these were over more than a month ago. *Hæmanthus albiflos* is worth growing for its drumstick-shaped heads of white flowers developed at this time of year. These are the 'pick' of the flowering plants in our houses in December. Expert florists, both English and foreign, who grow for our market, produce quantities of scarlet *Anemone*, *Carnation*, white *Lilac*, *Lilium Harrisii*, *Tea Roses*, *Tuberoses*, *Pyrethrums*, *Acacia dealbata* and scarlet *Pelargonium*, which are to be seen in quantity in the London flower-shops in December. Here it is difficult to induce plants to flower at a season when the sun does not shine for days together, the dull leaden sky giving place at times to heavy fog, which in London is so poisonous as to destroy most of the flowers that struggle into being.

London.

W. Watson.

Cultural Department.

Tomatoes Under Glass.

TWO crops of tomatoes may be grown under glass in a single season. Seeds for the first crop should be planted the last week in July. A good method is to pot off the young plants as soon as they are large enough to handle, in two or two-and-a-half inch pots, and plunge them in a bench of coal ashes, where they can remain for three or four weeks. Then the plants may be shifted to four-inch pots to remain until planted in the benches of the forcing-house the latter part of September. The period in which the plants occupy the four-inch pots is a time when the care and handling is of great importance, and will tell on the following crop, not because of lessened or increased vigor of the plant itself so much as in obtaining a form that will admit of training to produce the largest crop in the smallest space. The plants should never be allowed to become "drawn." Drawn plants will often produce large crops in the field, but under glass, and especially if trained to a single stem, it is desirable to have the first cluster of flowers and fruit as near the ground as possible, and this cannot be from drawn plants. Plants become drawn from being overcrowded or grown in too high a temperature and where there is an absence of light. The best plants for setting that I have ever seen were held back and not forced while in four-inch pots. Kept in a cool house where the night temperature was between 50 and 55 degrees, and ten degrees higher in the daytime, the plants made a slow and stocky growth and blossomed about the time they were set in the benches. These plants were of the *Lorillard* variety—which is about the best for winter growing—and on all the plants the blossom clusters, and later the fruit clusters, were only a few inches from the ground. Many of the plants produced seven clusters on a stem, which was pinched off at a distance of between five and six feet above the bench.

After setting the plants, the house may be kept moist but should be dry enough for the purposes of pollination during the period while the fruit is setting. I am inclined to believe that hand pollination is profitable. In a small house, 16 x 40, and containing 160 plants, about fifteen minutes is required to go through the operation, a spoon and stick being used. The operation should be repeated each day or every second day throughout the season or until the stems are full.

Plants set in the benches October 1st should begin to produce ripe tomatoes the 1st of December, and the fruits will continue to ripen for about two months.

Seed for the second crop should be sown in flats about the middle of December, and the plants will be ready to set in the benches early in February. Ripe tomatoes may again be harvested during the latter part of March and through April. This crop will give a larger yield than the first. The increased amount of light, and therefore heat, causes the individual fruits to grow larger.

The soil commonly used for forcing tomatoes is prepared by composting turf with from one-fourth to one-third its bulk of good stable manure. This makes a good soil. Tomatoes may be grown successfully in a soil composed of coal ashes, either anthracite or bituminous, with three per cent. (by weight) of peat moss added, both ashes and peat being sifted through a screen with four meshes to the inch.

Plant food in some form must be added to a soil of coal ashes, and this can be done most easily with chemical fertilizers. To each 100 square feet of bench area should be added four and three-quarter pounds of nitrate of soda, two pounds of muriate of potash, one pound of dissolved bone-black, one and one-half pounds of carbonate of lime.

The lime is added for the purpose of neutralizing the slight acidity of the peat moss. In three successive crops grown at this station, where both kinds of soil were used—the natural soil, both with and without chemical fertilizers—the greatest yield each time came from the soil of coal ashes and peat moss. The fruit from the artificial soil scarcely varies from that grown in natural soil either in form, size, color, or chemical composition.

By keeping off all lateral shoots and tying to a string, more plants can be used, and a yield of two pounds per square foot of bench area may be obtained.

Plants may be grown from cuttings as well as from seed, and this method is practiced by some growers. It has been my experience that cuttings produce fruit earlier than seedlings, but the yield is much smaller. For this reason seedlings are to be preferred.

The benches should be eight or nine inches deep in a tomato house. The house should be kept at a temperature

ranging between 65 and 70 degrees, Fahrenheit, during the night and about ten degrees higher in the daytime. The walks should be wet down every day to keep the atmosphere moist, but it is not necessary to syringe the plants.

Forcing-house tomatoes are liable to be affected by two common fungous diseases—*Cladosporium fulvum* and *Macrosporium* tomato. The former is the "mould" or "blight" of the field, and often attacks the plants in the fall, when they are first set in the benches, and again in the spring, when the heat has been turned off. The upper surface of the leaves affected with blight has a spotted appearance, and the under side of each spot will be covered with a brownish mould which becomes darker-colored as the spores are produced. Repeated applications of Bordeaux mixture or ammoniacal carbonate of copper will free the plants from this parasite.

The *Macrosporium* is known as "rot" and attacks the fruit. This disease is not so easy to check; it first appears as a brown or black decayed spot at the blossom end when the fruit is about half grown. Probably the disease attacks the tomato through the pistil of the flower and the mycelium continues to develop in the ovary, which rapidly increases in size and becomes half grown before the disease is apparent. The decay usually continues until the tomato is about half destroyed. If the spores of the fungus enter through the flower, as is supposed, any application of fungicides that would kill the spores would also have a tendency to kill the pollen, if not to injure the pistil of the flower, so that until more is known about this disease it is hardly safe to advise spraying to hold it in check. It is seldom serious, however, if the proper conditions prevail in the forcing-house.

Winter tomatoes are attacked by a white fly-like insect known as the "Plant-house Aleyrodes" (*Aleyrodes vaporariorum*). The larvæ may be found upon the under surface of the lower leaves during the bearing season of the plants and the adults will be seen flying about and depositing eggs toward the tops. Fumigating the house occasionally will hold this insect in subjection.

An eel worm or nematode, *Heterodera radicola*, forms galls upon the roots of tomatoes grown in the forcing-house. The usual remedy is to use fresh soil each season and throw the old out to lie over winter and freeze. Nematodes are not found upon the roots of tomato plants grown in a soil of coal ashes and peat moss.

Instead of growing new plants for the second crop, the old ones may be cut off a foot above the bench, turned down, and buried in the soil. New shoots will be thrown out, and these will produce a fairly good crop of fruit. The old root-system is again used, and though the plants will grow vigorously, the crop can hardly be expected to equal that obtained from new plants, especially if nematodes are troublesome. Where these worms are abundant, it is probably better to grow new plants. The price of hot-house tomatoes is a variable quantity. Last winter, in New Haven, the crop sold at thirty-five cents a pound, wholesale, during the holidays. Toward spring the price was considerably less. At present thirty cents is about as much as the dealers like to pay. Whether the crop is a profitable one or not depends upon circumstances, but tomatoes can doubtless be grown at a profit near good markets, and especially by market gardeners who wish to keep a part of their help employed the year round. These men know the markets, and can dispose of the crop at an advantage, where others might fail.

Experiment Station, New Haven, Conn.

W. E. Britton.

Begonias.

AT this season, when showy greenhouse plants are scarce, and the gorgeous display of *Chrysanthemums* is missed, winter-flowering *Begonias* are useful for the conservatory. New and old varieties can be had in abundance so that the most fastidious taste can be satisfied. In grouping *Begonias* in conservatories several plants of one kind ought to be grouped together to produce the most pleasing effects. Well-grown plants of *B. Froebeli*, a tuberous-rooted species, can hardly be excelled by any that blossom at this season or perhaps at any season. It has not as large individual flowers as some of the tuberous-rooted kinds that bloom in summer, but its flowers are as rich in color as those of any other *Begonia*. They are brilliant scarlet, and are produced in drooping cymes on red peduncles which are more than a foot long when the plants are grown well. But the flowers are not the only attractive part of this plant; it has handsome foliage, the leaves sometimes measuring more than one foot in length and six or eight inches in breadth, the upper side velvety

with the finest purplish hairs. It has been in cultivation twenty-four years, but is seldom seen in gardens although seeds are offered annually in the catalogues. Perhaps one of the reasons why it is not oftener grown is because in raising it from seed the young plants do not produce as large flowers or leaves as older ones. The best flowers are obtained here from tubers several years old. The cultivation of this beautiful *Begonia* is very simple. When the flowering season is over and the leaves begin to lose their color, water should gradually be withheld. After the plants have lost their leaves, then the pots and tubers may be put on a dry shelf where they can remain until they show signs of growth in the fall. The old soil is then shaken away from the tubers and then they are repotted into smaller pots. When they have grown until the young roots have penetrated the fresh compost and reached the sides of the pots they should have a shift into a larger-sized pot. A compost of turfy loam, leaf-mold and sand suits this *Begonia*.

Begonia Socotrana makes a good companion to *B. Froebeli*, and about the same treatment suits them both. A well-grown group of these plants is a sight not easily forgotten. *B. Haageana* is also in flower now; in fact, it is almost a constant bloomer. It is easily grown and makes fine bushy plants bearing large clusters of showy bluish-white flowers. Its leaves are metallic green with red nerves and of a purplish color on the under side. The flowers are borne on long stout peduncles, and their outer segments are covered with red hairs. *B. Credneri* is a hybrid rather like the last species in habit and producing immense clusters of showy flowers.

The most floriferous of *Begonias* at this time is *B. incarnata*. It is a well-known plant and is grown by almost every one who has a greenhouse. The rose-colored flowers are produced very plentifully and brighten the plants for a long time in winter. Young plants that were raised from cuttings made last spring are nice flowering plants now. *B. semperflorens gigantea rosea* could hardly be spared from our greenhouses, now, with its large dark green shining leaves and numerous stout erect panicles of bright vermilion flowers. It is easily grown, and raised in spring makes nice blooming plants now. A near relative of this good *Begonia* is *B. Amelæ*, another profuse bloomer, but having flowers not quite as large as those of *B. semperflorens rosea*. A good dwarf pot plant is *B. Bruanti*, with small obliquely lobed leaves and many flowers borne almost without cessation on short axillary peduncles. This *Begonia* also makes a useful bedding plant in summer. The old and well-known *B. fuchsoides*, when well grown, is as pleasing and as useful as any other. Although it makes a good pot plant it is always seen at its best in a bench or border with its stems trained to a pillar or a stake where its Fuchsia-like flowers, in drooping branched panicles, are displayed to best advantage. Many more could be added to the list: *B. Abundance*, *B. argenteo-guttata*, *B. Corbeille de feu*, *B. Saundersii*, *B. nitida* and its white variety, *B. phyllomaniaca*, besides newer kinds which are plentiful now and many of them in flower at this time.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

Orchid Notes.

THE present time is a critical one in the cultivation of Orchids. It is the resting season of a great many varieties, and water should be withheld to a certain extent with only an occasional syringing, applied as the pseudo-bulbs begin to show shriveling. An overabundance of water now might result in that much-dreaded disease, the spot. A great number of Orchids are destroyed by overwatering during this season.

During the winter months, while the most beautiful of winter Orchids are in flower, a superabundance of moisture should be carefully guarded against, as it certainly will prove destructive of the beauty of the flowers. The house in which they grow should only be dampened on bright, sunny days, or when heavy firing is necessary to maintain the proper temperature, and this should not exceed sixty-five degrees during the day. The floor should be allowed to become quite dry toward evening and the temperature should be reduced to about fifty-five degrees. Where it is possible, a small house should be reserved for the Orchids as they come into flower. They can then be grouped with other flowering and foliage plants to produce a pleasing effect, and the temperature can be kept dry and cooler in order to preserve the flowers longer. After they are done flowering, repotting should be attended to. The best time for this work is during their resting season, except in the case of varieties which bloom as they make their new

growth. Every plant should be examined, as some may need more material in order to have them firm in the pots and baskets, even if they do not need to be repotted. In repotting fill the baskets and pots three-quarters full of new charcoal, which is better than crocks, as it does not become sour. Care should be taken not to destroy any more of their adventitious roots than can possibly be helped, and it is essential to guard against overpotting. Good fibrous peat that has been thoroughly washed and free from dirt and insects should be used. Press in the peat as firmly as possible and use no moss with it, as this soon decays and becomes sour. A light layer of moss on the top of the peat is beneficial. It encourages the tender roots and does not become sour as it does when packed in with the peat. Another very important point is to see that the plants are thoroughly washed of all dirt and insects, for cleanliness in every respect is a cardinal point in successful Orchid culture.

After repotting, the temperature should not be raised too quickly, as this will tend to start an early growth, which will be finished before fall, when a second growth would be liable to take place, and this will weaken the plant and cause inferior flowers. The increasing brightness of the sun during the early spring months will necessitate shading to guard against burning. For this purpose some prefer dimming the glass with a mixture of driers and oil. Others use whitewash; others still use shades of small slats. The former is a good practice, but it requires much labor to clean off the glass in late autumn. Shading with cheesecloth or light muslin, arranged so that it can be conveniently lowered during sunny days and rolled up during cloudy weather, is convenient. It gives an equal shading throughout the house and breaks off the brightest of the sun's rays. The glass does not retain the heat as it does when painted, and the house will be several degrees cooler under cloth. As the Orchids begin to show their new growth a greater amount of moisture and watering will be needed. An occasional dipping, when the pseudobulbs are about half-grown, in a very mild solution of cow-manure will be beneficial in producing strong growths.

While some of the richest and most delicately colored flowers of some varieties are at their best during these few months, it will be interesting work to cross a few varieties, as there is no telling what the seed may produce in a few years hence. It requires much patience to raise some Orchids from seed. Select only strong plants of the best varieties when crossing in order to obtain good fertile seed. The seed-pod generally ripens in from eight to twelve months, and needs watching toward the time of ripening, or it will burst and much of the seed will be lost.

The seed should be sown as soon as ripe in pots prepared specially for the purpose. California peat is a good material for these pots, as it is fine in fibre, and the seed will not settle very far into it. The seed should be sprayed only after it is sown, as heavy syringing washes it away. After the germination and a leaf or two are seen the seedlings should be transplanted into very small pots. We have now a seedling *Cattleya* which has been flowering for the past five weeks, besides several *Cypripediums*, which are worth describing.

Tarrytown, N. Y.

William Magee, Jr.

Cypripedium bellatulum.

THE genus *Cypripedium* may be said to consist of three well-marked divisions, though but one of these is generally admitted—the tropical American kinds grouped under the name *Selenipedium*. These are easily recognized by their long foliage without marking, and the pollen is dry and powdery and not of the wax-like consistency common to all *Cypripediums* from the east; there is also a structural difference in the seed-capsule, and various smaller details make a dividing line between those that come from the east and west. The *Cypripediums* proper, most of which have beautifully tessellated leaves, are natives of the islands of the Malay Archipelago, where they occur mostly in isolated spots, two species rarely growing together, and also of the mainland of the East Indies, reaching up through Burma and into the Shan states, whence came our most recent acquisition, *C. Charlesworthii*, sent home by a British officer fortunately possessed of botanical knowledge and taste.

The section of the genus, however, to which reference is specially made now is that which embraces *Cypripedium bellatulum*, *C. niveum*, *C. Godefroyæ* and *C. concolor*, with their several varieties. These are distinct in having flowers of a uniform ground color, from pure white to various yellowish white shades; in the great width of petal, the outer segments

of the flowers being equal, or nearly so, and in the markings of spots instead of stripes. The foliage of this division is also strikingly individual, being thick and fleshy, tessellated, and not of such large dimensions as in the other sections. The flower-scapes are always dwarf.

This last section presents as great difference, from a cultural point of view, in the plants themselves. And while separating them botanically is not usually practiced, the cultivator, if he wishes to grow these gems, must be most careful to give them suitable treatment, or they will speedily be classed among the things that were. Hybridists were quick to note the striking characteristics of this section, and soon began to use them. Some of the most interesting results have already been obtained, and it is impossible to predict what is in store, so that it is not so much on account of the species mentioned, as the hybrids that have been raised from them by crossing with other species, all of which partake, to a great extent, of the habit of growth of *Cypripedium bellatulum* or its kindred. These hybrids are now among the most prized in collections, and it is essential to understand their requirements.

It has often been stated in published descriptions of these plants that they grow on lime-stone rocks, and that the addition of this material to the potting compost will greatly facilitate their growth. We have no lime-stone in this district, but old mortar refuse is an excellent substitute, as well as useful to keep the potting soil sweet and porous, and it is well to use it as drainage for the pots. If newly imported plants are received, it will invariably be found that a deep red clay of a most tenacious nature is adhering to the thick roots. We find even now, after a year or two of watering, that this red earth still sticks to the roots that are alive and sound. This fact set us to thinking about the usual peat and moss compost generally advised, and prepared us somewhat for a later experience—that of finding in some of the noted English collections whole shelves near the roof-glass filled with these *Cypripedes*, all in most vigorous health, and potted in loam alone, with the addition of lime-stone. The fact is our moss compost holds too much moisture in suspension for the plants, if it is kept in a growing condition, as with other *Cypripedes*; and if the moss is allowed to die it is even worse, for the plants like to be in a fairly dry condition before water is given. If a few pieces of loam-fibre are placed at and around the collar of the plants it will be found ample for their needs, and water must never be given until it is really needed, or damp will take off even the strongest plants.

Another point to be observed, and it is the most important of all, is to suspend the plants where they will never be watered or sprayed over the foliage. However they may be placed in a wild state, whether in clefts or fissures of the rocks, or if the moisture is rapidly evaporated by the air, certain it is that we must not apply it overhead. It is an easy matter to use pots of exactly the same height, putting several of them together in a basket and dipping them in a vessel of water when dry; no danger of decay at the base of the leaves need then be feared. It is the only difficulty to be apprehended, and one, too, that has prevented many from taking up the cultivation of this exquisite set of plants.

Plants newly received have most likely come by way of Europe, and our experience, which is also that of others, is that thrips are very certain to be present. These destructive little pests seem inseparable for some time, because water cannot be applied so freely as with other species. Strong tobacco dust, a pinch in each growth, will discourage them in time, and fumigating may also be resorted to, as this whole genus will not take harm from the operation.

It is not too much to say that *Cypripedium bellatulum* at least should be grown in every collection, however small. It is also the easiest to obtain, presents great variety in itself, both in the leaves and flowers, and will almost surely lead one to want other species, as they present, taken altogether, a series of gradations that point to one common origin, though some are insular while others grow on the mainland, far in the interior. The gem of the series is a spotless form of *C. bellatulum*, discovered by Commissioner Moore, who also found *C. Charlesworthii*. The foliage is also devoid of color other than green, and this fortunately led to its being kept separate by its discoverer.

Chemical fertilizers for Orchid culture is a delicate subject, and many cultivators denounce their use in strong terms. We have, however, for some time used them in homœopathic doses, and in some instances with surprising results. We have no hesitation at this time in saying that a little nitrate of soda or sulphate of ammonia, or, better still, both alternately used as a weak solution for watering, will give depth of color to the leaves and vigor not to be had under other treatment. This

is mentioned for the purpose of experiment by cultivators of an inquiring turn, rather than by way of refutation of the published opinions of other cultivators.

South Lancaster, Mass.

E. O. Orpet.

Correspondence.

Coöperation in Flower-growing.

To the Editor of GARDEN AND FOREST:

Sir,—Previous to the organization of the Boston Coöperative Flower Growers' Association in 1892, near-by growers for market made sales direct to the retail stores, carrying their flowers with them and making a daily canvass of the business portion of the city. In this toilsome work much time was wasted. There was no means of gauging the supply and demand, and prices had a very unsatisfactory basis. No agreement existed among growers, and between buyer and seller it was often a contest of wits; neither the grower nor the buyer expected to get nor to give what the other demanded. It was noon when the tired travelers returned, and often after a valuable lot of flowers had been disposed of for half their real worth. Another method, still in practice to some extent, was to make consignments to commission-men. Every one who disposes of his produce in this way puts himself in the commission-men's power. He must trust them implicitly, and though they may be, and in most cases are, honest, there is always some uncertainty as to returns.

Eventually the growers came together and drew up articles of agreement. These were signed at a meeting held in Horticultural Hall on October 18th, 1892, and a charter was obtained some time later. The market was opened on the first of November of the same year, when an auction sale for space was made, at which the corporation realized \$225.00 in premiums above stated rentals. The market has been successful from the start. The retail stores ignored the combination, and treated those who remained out of it with extreme consideration. But the provision of a meeting-place, the establishing of a standard of value and of a shelter during winter proved decided advantages, and three-fourths of the market growers are now in the association, including all the best ones. Prominent among stand-holders are William Nicholson, of South Framingham, the Carnation specialist; Joseph Tailby, his son William, being one of the original promoters, treasurer, clerk, an auctioneer; Peter Ball, of Malden, Roses; Fisher Brothers, Montvale, Carnations, Asparagus and Ferns; W. H. Elliott, Brighton, who makes a specialty of Asparagus plumosus nanus, and ships it to all parts of the country; Mann Brothers, Randolph, known as the introducers of Mutual Friend Chrysanthemums and growers of fine bulbous stock; F. Matheson, Waverly, Roses; William Edgar, Waverly, fine Chrysanthemums and Mignonette.

With the gain of the association in numbers and importance it became difficult for the best stores to get first-quality stock, and this predicament was taken advantage of by the few growers who were not members of the association. The stores were at last forced to patronize the market for protection, and its prices now rule.

The market is now held under the Park Street Church; every available foot is rented, and the enterprise pays well. The rules of the market allow only growers to sell, and commission-men are excluded. At the time of my visit, between six and eight in the morning, I was surprised at the quantity and quality of the stock sold and the shortness of time in which it was disposed of. The bulk of the business is done within an hour. It had been my impression that the street fakir was an adjunct of the stores, buying left-over stock. This, I find, is not true. Even the fakir knows a good thing. Though he wants only second-class stuff, he wants it fresh. He barter long and patiently, but always pays cash, and therefore is a welcome visitor. Really he is a benefit to the trade rather than an injury. He deals in stock the storekeepers would not buy and the grower could not otherwise dispose of, and sells to a class who would not go into the stores to buy. Nothing is sold at retail, and what is left over is held by the manager for sale during the day.

Wellesley, Mass.

T. D. Hatfield.

Recent Publications.

A report on *The Culture of Hemp and Jute in the United States*, by Charles Richards Dodge, Special Agent, has just been published by the Department of Agriculture. Practically very little fibre from either of these plants is now produced in the United States. Thirty-seven years ago

75,000 tons of hemp were grown, while last year only 5,000 tons were reported for the whole country. The decline in the production of hemp dates back, primarily, to the decline in American shipbuilding; it was hastened by the introduction of Manilla hemp, and later still by the importation of jute. Additional falling off in production is due to the decline in prices for hard-cordage fibres, such as sisal and manilla, through overproduction stimulated by the high prices of these two fibres five or six years ago. The Department of Agriculture began to interest itself in extending the cultivation of Hemp in 1890, when the consumption of binding twine amounted to 150,000 tons a year, and it was then shown that if one-half of this twine were made from home-grown hemp, instead of from manilla or sisal, there would be a saving to consumers and an advantage to American farmers amounting to nearly two million dollars a year. The effort then made to revive the North River hemp industry in this state failed, and it has suffered a decline in Illinois, where much low-grade hemp was once grown for binding twine. To this rather gloomy history are added interesting notes on soil, seed, harvesting, etc., both in this country and abroad. Nearly three hundred patents have been issued in the United States for machines for breaking hemp, many of which have proved failures, and none have fulfilled the essential requirements, so that the Kentucky Hemp grower of to-day relies on the rude and clumsy handbrake of his grandfather's time, a device similar to the one still used by the Hemp farmers of Brittany. Satisfactory machinery would, no doubt, give a great impetus to the cultivation of this fibre. It is doubtful, however, whether hemp will ever be used again in the manufacture of coarse-woven goods, since cotton is so cheap that it has superseded both hemp and flax in common manufactures. Hemp has probably no future use except in the rougher manufactures—that is, for the cheaper kinds of cordage and twine, although it may be fit for bagging. It is doubtful if hemp can ever be produced so as to compete with jute-butts, but its larger employment in cordage manufacture ought to enable it to recover a part of the ground it has lost as an American fibre industry. A rough product that could be cheaply produced would be good enough for binding twine, and might be employed with advantage in the cheaper grades of small cordage now made of imported jute because of its superior strength and less liability to deterioration when stored for any length of time.

Although hemp is a stronger and better fibre than jute, and although its cultivation is fully understood here, it is a fact that the large present demand for India jute would insure a ready market for American jute if it could be raised here in quantity. Nearly five million dollars' worth of jute fibre was imported into this country for manufacture during the last year, and yet it is perfectly adapted to cultivation in the southern states, and its large yield per acre ought to make it a staple production. It is used for weaving into fine and coarse fibres, for making twines and cordage and in the manufacture of paper. A limited experience in cultivating the plant in this country seems to prove that jute of an excellent quality can be grown here. On proper soils and with our improved implements in preparing the ground an American farmer ought to count upon three thousand pounds an acre, but here, too, the success will largely depend upon the use of machinery for extracting the fibre. The southern farmer could hardly meet the demand for cheap jute, but might, perhaps, through the demand for higher-priced fibre at prices which he would be able to realize in competition with the Indian product. After all, the question of economical production of jute in the United States is not yet practically solved. It has been demonstrated that the plants will grow luxuriantly in many parts of the south, and that the bark contains fibre of excellent quality, and the prospect warrants careful experimentation with a view to ascertaining the actual cost of growing this crop and of extracting and baling the fibre. The subject is such an important one that inquiries in relation to the

matter are constantly sent to the Department of Agriculture, and although there is nothing in the situation to encourage any extravagant expectations, it is certainly one worthy of study in these times when the rewards of agriculture are so small, and when it would be a great advantage to the farming population, especially of the south, to add another one to their small list of profitable crops.

Notes.

A correspondent of the *Strawberry Culturist* says that he treated a lot of Strawberry-plants in matted rows which were badly rusted, by spraying them with borax lye, a material used for soap-making, using one can to a forty-gallon barrel of water. This arrested the rust and kept the plants growing, so that berries were picked from these beds ten days after the unsprayed plants had quit bearing.

Two years ago a florist near Boston exhibited a variety of *Antirrhinum majus* which was conspicuous for its long stems, furnished throughout with flowers of a singular pure white and large size. We believe it is the same plant that is now called Giant White, and it blooms as freely out-of-doors as any of the Snapdragons, but when grown in pots for winter decoration of windows and conservatories it is a singularly useful plant. The flowers are fragrant.

A recent number of *The American Agriculturist* gives a picture of a cluster of the McPike Grape, of which we have spoken in a previous number. The photograph shows that the berries are of the largest size, while they are said to be of better quality, finer flavor, and with fewer seeds than the Worden, of which this Grape is a seedling and which it resembles in general appearance. The foliage is said to be large and the joints shorter than in the parent plant, and the clusters ripen very evenly.

The number of species of plants which have become extinct is very large, and yet generic groups rarely die out. Comparative researches show that much the greater proportion of plants whose remains have been preserved in a fossil condition from earlier geologic periods belong to the genera which are represented by plants now living, although many of these existing plants differ specifically from the earlier ones. From this it seems that new types are outgrowing the old ones constantly and take their place in the general scheme of life.

Mr. W. H. Bristol, of San Bernardino County, California, has now five acres of Logan berries, and before a late meeting of the Southern California Farmers' Institute he showed photographs of the fruits, which were larger than any blackberry. The plant has a trailing habit like that of a Dewberry and grows sometimes fifteen feet in a single season. The berry is of a bright dark red, with a flavor which can hardly be described in words, but is said to be something like that of a red raspberry, though more tart and sprightly. For jellies and jams it is altogether unsurpassed.

In recent years about sixteen per cent. of all the bananas brought to this city came from Cuba, twice as many from Jamaica, and the remainder from Aspinwall, Port Limon and other Central American ports. During the last five months none of this fruit has come from Cuba, since foreign vessels are not allowed to visit interior ports of the island, and the bananas, brought in carriers and transferred to steamships at Gibara, on the northern coast, were badly bruised and unfit for transportation. The imports for 1896 are, however, as heavy as those of last year, when more than four and a half million bunches were sold in this city. The shipments of this fruit from Jamaica are much larger than heretofore. The rich red bananas which formerly came from Baracoa, Cuba, are now entirely out of our markets. Bananas from Port Limon now command the highest price at wholesale, bunches of the largest size selling for \$1.20 each by the truck-load, those from Jamaica for \$1.15, and from Aspinwall for \$1.00.

During the fortnight before Christmas, West Street, for a half mile above the Fall River boat-landing, was packed with eighty-five car-loads of Christmas trees, the majority being Balsam Fir, with some Spruce. Although the Spruce trees are more bushy and handsome, the Firs are in greater demand, because they are more open and so require less decoration. About thirty-five car-loads came from the Catskills and fifty from Maine, besides two thousand bundles carried on a schooner. The demand was this year fairly good, especially for the smaller sizes. Seventy-five cents was the average price

for bundles of trees six, eight and ten feet in height, there being two or three of the larger trees in each package, and as many as five to seven of the shorter ones. Large, shapely trees sold at from \$5.00 to \$30.00 apiece, and trees thirty-five feet high brought \$35.00 each. The prepared trees are hauled to the railways in hayracks, where they are loaded on platform cars and cost nine cents a hundredweight for freight to New York.

A correspondent of the *Springfield Republican* calls attention to the fact that many wealthy men in various parts of the country are getting possession of large blocks of forest land, either as permanent investments, as game preserves or places of summer residence. Leaving aside the immense tracts set apart by the National Government and by the state of New York in the Adirondacks and the Catskills, clubs and private individuals now own nearly a million acres of forest preserves in this state, while in Maine, especially in the Rangely Lake country, in the upper White Mountains of New Hampshire, and along the tributaries of the Connecticut and Androscoggin rivers there are many large preserves. Blue Mountain Park, which was established by Austin Corbin in the south-western part of New Hampshire, covers thirty-two square miles, while the estate of Mr. George W. Vanderbilt, of Biltmore, contains a forest of 100,000 acres, which will be the field of systematic experiments in practical and scientific forestry. Of course, there is no guarantee that these great tracts will remain permanently in forest, and yet the reservation of forest land as such, whether by single owners or by associated membership, is a hopeful sign of the future.

Selected Spitzenburg apples, and a limited supply of Newtown pippins, from Vermont, are now the best varieties seen in the fancy-fruit stores, where highly flavored and showy red apple sells for thirty-five to fifty cents and the more costly pippin brings seventy-five cents a dozen. The cold weather of the past week seriously interfered with the fruit trade here, all sidewalk and other outdoor stands being closed. The wholesale apple market has been crowded, too, with stock that in milder weather would have remained on the docks. Wholesale prices for large lots range from seventy-five cents to \$2.00 a barrel for fair, prime and fancy quality New York State fruit of such varieties as Greening, Baldwin, King, Northern Spy and Spitzenburg. The market abroad is even more depressed. Messages received last Monday from dealers in Glasgow, Liverpool and London by Otto G. Mayer & Co., of this city, exporters, state that thousands of barrels of American apples have been left on the docks in England for ten days past. Many have been sold for as little as a shilling a barrel, and four shillings is all that can be got for the best fruit. Canadian and Boston apples have suffered most, but the glut is unprecedented and ruinous to all American shippers.

Sir Henry Dering, one of the diplomatic officers of Great Britain in Mexico, has made an interesting report to the Foreign Office in regard to the economic plants of that country. Ginger, *Zinziber officinale*, which was introduced into America as early as 1540, is now found, according to Sir Henry, growing wild in many parts of Mexico. Not only are the dried rhizomes used as a spice and a medicine, but the fresh or green rhizome, washed, scraped and preserved in syrup, or cut in pieces in candied sugar, is well known as a sweetmeat. The plant is propagated by division of the rhizomes, each piece being planted three inches deep and cultivated like a potato. The sets are covered with well-rotted manure, over which a thick layer of leaves is placed to retain moisture and give extra nourishment to the growing plants. Ginger is an exhausting crop, and therefore the land is kept thoroughly weeded and highly manured. The plant flowers in autumn, and in January the rhizomes are forked out of the soil and average from two to three ounces in weight. When lifted from the ground and cleaned of adhering dirt they are plunged into boiling water to destroy their vitality and then dried in the sun, when they present a brown wrinkled surface. To produce the so-called uncoated ginger the epidermis is scraped from the rhizome, which is subjected to some bleaching, generally from the fumes of sulphur, and much of the commercial ginger is practically whitewashed to give it a better appearance. This often, however, covers an inferior quality, and can be detected by the ease with which it rubs off. Good ginger, when not whitewashed, is of a pale buff color, breaking with a short mealy fracture and presenting bristly fibres on the surface. Uncoated ginger is considered the best for ordinary use. The returns from an acre of land vary, of course, but, under favorable circumstances, the crop ought to be 4,000 pounds or more.

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